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## DISEASES CAUSED BY BACTERIA AND FUNGI.

PAINE, C. G. (1935). **Haemolytic Streptococcal Leucocidin. Preliminary Report.** —*Brit. med. J.* June 29th. 1311-1313. 1 fig., 3 tables. [8 refs.]

In this preliminary report it has been shown that the type-specific acid-soluble M protein obtained from matt variants of haemolytic streptococci exerts a marked inhibitory action on the motility of normal leucocytes. This action can be neutralized by the admixture, before exposure of the leucocytes, of immune serum. This immune serum gave a positive precipitin reaction with solutions of the M protein, and also contained bacteriotropins for the strain of haemolytic streptococci from which the M protein was prepared. Attention has been drawn to the close similarity that exists between the resistance to phagocytosis exerted by young virulent cultures of matt variants of haemolytic streptococci and the leucocidin action of the acid-soluble M protein that can be obtained from the organisms of such a culture.—S. J. EDWARDS.

LOEWENTHAL, H., & PRADHAN, M. G. (1935). **Haemolysin from a Strain of Animal Streptococci.**—*Brit. J. exp. Path.* **16.** 230-236. 2 tables. [14 refs.]

A method is described for the preparation of haemolysin in a serum-free medium from streptococci derived from an animal infection. The medium consists of tryptic bicarbonate broth to which cysteine hydrochloride is added. The negative oxidation-reduction potential, maintained in this medium during the whole period of incubation and filtration, allows the secretion and harvesting of a potent streptolysin. The serum-free haemolysin of this animal strain is subject to reversible oxidation and reduction. Haemolysin produced by this strain in serum broth is not readily oxidized and its titre can be raised again by reduction when it has dropped during storage.—S. J. EDWARDS.

PAGNINI, U. (1934). Richerche sul comportamento nel latte dei più comuni-streptococchi degli equini. (*Str. equi*, *Str. pyogenes*, *Str. equinus*, *Str. foecalis*). Di un mezzo atto a svelare regolarmente l'attività coagulante anche negli stipiti di Str. equi ed equinus. [**Behaviour in Milk of the more Common Streptococci of the Horse. A Differential Medium**].—*G. Batt. Immun.* **13.** 253-267. [37 refs.] [Abst. from English, French and German summaries].

All the kinds of streptococci from equines examined have the power of coagulating milk, but to diverse degrees. *Str. faecalis* is the most active in forming a clot, usually in 24 to 48 hours, at 37°C. and often at 10°C.

*Str. pyogenes*, under ordinary conditions of culture at 37°C., either clots milk very slowly or not at all ; at 10°C. never. The addition of a small quantity of broth or of defibrinated blood to the milk as suggested by GORINI and CALLERIO – or immersion of the tubes containing milk alone in a water-bath at 100°C. after a few days at 37°C. – are useful methods of showing up its relative inability to clot milk. Gorini's 1932 method gives even better results. Culture under anaerobic conditions is also a useful method. *Str. equi* and *Str. equinus* do not under ordinary conditions of culture clot milk either at 37°C. or 10°C., but when grown at 37°C. in tubes [presumably of milk] containing sunken pieces of liver and lightly sterilized at 100°C., both *Str. equi* and *Str. equinus* will acquire the property of regularly coagulating milk, often within 24 to 48 hours. Coagulation fails only in rare cases and can then be produced by heating.—A. W. STABLEFORTH.

SIEBER, G. (1935). Die Brauchbarkeit der Jodschnellreaktion zum Nachweis galtkranker Milch. [**Value of the Rapid Iodine Reaction for showing Mastitis Milk**].—*Münch. tierärztl. Wschr.* **86.** 61-67. 14 tables. [6 refs.]

The reaction described depends upon the power of unheated milk to decolorize an iodine starch solution, and is one of the tests described for the detection of milk which has been heated above 60°C. Sieber has tested its value as an indicator of the presence of chronic streptococcus mastitis in bovines, and concludes that it is not to be recommended because it is less simple and less accurate than other indirect methods, e.g. the catalase test.—A. W. STABLEFORTH.

I. JULIANELLE, L. A., & WIEGHARD, C. W. (1935). **The Immunological Specificity of Staphylococci. I. The Occurrence of Serological Types.**—*J. exp. Med.* **62.** 11-21. 4 tables. [10 refs.]

II. WIEGHARD, C. W., & JULIANELLE, L. A. (1935). **The Immunological Specificity of Staphylococci. II. The Chemical Nature of the Soluble Specific Substances.**—*Ibid.* 23-30. 2 tables. [3 refs.]

III. JULIANELLE, L. A., & WIEGHARD, C. W. (1935). **The Immunological Specificity of Staphylococci. III. Interrelationships of Cell Constituents.**—*Ibid.* 31-37. 2 tables. [16 refs.]

I. Precipitation tests made with a number of purified carbohydrates from different strains of staphylococci show that they are separable into two different and distinct types, the one avirulent and the other virulent. This type-specificity was not demonstrable by agglutination tests or by lysis by bacteriophage.

The carbohydrates extracted from staphylococci are specific and do not react with antipneumococcus, anti-Friedländer or antityphoid sera. The preparation of anticarbohydrate antibodies is discussed.

II. This paper describes the method of extraction and purification and also the chemical properties and characteristics of the carbohydrates extracted from the two types of staphylococci referred to in paper I. In both cases they proved to be polysaccharides, but did not represent single chemically pure compounds. Hydrolysis diminishes and ultimately destroys the specificity of the substances. [It is interesting to note that both the virulent and avirulent strains of staphylococci are stated to elaborate polysaccharides in contrast to the pneumococcus, in which virulence is associated with the presence of a polysaccharide. Apparently in staphylococci it is not the presence but the type of polysaccharide which governs virulence].

III. This is a study of the interrelationship of the carbohydrate and protein derivatives of staphylococci. The carbohydrates which are type-specific are not antigenic in rabbits, but do produce an immediate specific skin reaction in patients infected with staphylococci. The proteins, however, are common to both types of staphylococci, are antigenic in rabbits and give rise to a delayed specific skin reaction.—GWILYM O. DAVIES.

HOFFSTADT, Rachel E., & CLARK, W. M. (1935). **Studies on the Antigenic Structure of the Variants of Staphylococcus aureus.**—*J. infect. Dis.* **56.** 250-254. [12 refs.]

Several investigators have noted that staphylococci contain a soluble specific carbohydrate. In this paper the authors show that the smooth yellow undissociated type of *S. aureus* contains a specific carbohydrate which differs chemically and antigenically from that contained by the rough white variant of the same organism. —GWILYM O. DAVIES.

JAKES, J. (1934). Projevy antagonismu některých mikrobů k bacilu uhláku na umělých zivných půdách a v zemi. [**Antibiotic Action of Some Bacteria on** *Bacillus anthracis*].—*Biol. Spis. vys. Sk. Zverolék.* **13.** 1-19. [16 refs.] [Abst. from German summary].

The author has found that *Pseudomonas pyocyanea*, *Chromobact. prodigiosum*, *Proteus vulgaris* and *Bact. aerogenes* are antibiotic against *B. anthracis* in the above order. This action is best seen by inoculating a drop of nutrient fluid with the antagonistic bacteria and observing it microscopically. The antibiotic action is most evident at 37°C. but at lower temperatures *B. anthracis* sporulates, in which condition it is resistant.

Under the action of an antagonistic organism *B. anthracis* shows morphologically atypical forms which do not stain uniformly. The most intense action is represented by bacteriolysis.—J. E.

BARTELS. (1935). Intrakutane Milzbrandschutzimpfung nach Besredka und mit Lanolin-Vaccine der I.-G. Farben. [**Vaccination against Anthrax by Besredka's Method and by Lanolin Vaccine**].—*Dtsch. tierärztl. Wschr.* **43.** 275-276. [5 refs.]

327 cattle and 11 horses were vaccinated against anthrax by Besredka's method [i.e. intradermal injection of vaccine]. Of these, one bovine succumbed to anthrax within three months of inoculation, but all the others remained free from the infection though cases of anthrax occurred in the districts at the time. In another province a vaccine was used consisting of spores mixed with lanolin to form an ointment. This was introduced into the deep layers of the skin through a small incision. Of 121 bovines treated in this fashion, none subsequently contracted anthrax though the disease was prevalent at the time.—E. J. PULLINGER.

TSCHAIKOWSKY, W. K. (1935). Methoden zur Gewinnung einer einheitlichen Milzbrandvakzine und abgetöteter Kulturen zur Impfung. [**Unheated Killed Anthrax Vaccine**].—*Zlb. Bakt. I.* (*Orig.*). **134.** 239-244. 4 figs.

A glycerin suspension of spores of a strain of *Bacillus anthracis* of high virulence in the presence of a solution of platinum chloride, lead acetate and gold chloride was subjected to irradiation with unfiltered anode rays from a 165 kilovolt 4 milliamp. valve at a distance of 24 cm. Spores were killed after irradiation for two hours. By reducing the amounts of heavy metal in solution the destructive effect of the

rays was diminished. Irradiation for half an hour, in the standard medium quoted, reduced the vitality of anthrax spores to a condition suitable for vaccine preparation. —E. J. PULLINGER.

EHRLICH, C. (1935). Ueber die Bedeutung der Vererbung der Tuberkuloseanfälligkeit beim Rinde. [**Hereditary Predisposition to Tuberculosis in Cattle**].—*Z. Zücht. B.* **10.** No. 1. 1-10. [7 refs.]

It is suggested that cattle may have a hereditary predisposition to tuberculosis which is passed down through the female, and that this predisposition shows up more strongly in certain families. Genealogical tables in support of this idea are quoted. Thus in one case, from a non-tuberculous dam, there were descended during the course of four generations 72 tuberculous animals. Again, a non-tuberculous dam produced one tuberculous female calf whilst there were one tuberculous and two suspected tuberculous calves in the second generation and one tuberculous calf in the third generation. From another tuberculous dam there were descended three tuberculous calves in the first and one tuberculous calf in the second generation. [Unless the most detailed information is recorded regarding the hygienic conditions existing during the lives of these animals, it is quite impossible to judge the value of such data in connexion with the above hypothesis]. —E. J. PULLINGER.

RAUTMANN, H. (1935). Untersuchungen über die Generalisation der Tuberkulose beim Rind. [**Generalization of Tuberculosis in Cattle**].—*Dtsch. tierärztl. Wschr.* **43.** 115-122. 4 tables. [18 refs.]

Rautmann concludes from an analysis of the distribution and character of the lesions in 267 tuberculous cows that the dominant path of infection is by way of the lungs whilst the intestine plays a minor role. Lesions were found in the lungs in 98·5 per cent. of cases and in the mesenteric glands in 23 per cent. He believes that, where there exists coincident tuberculosis of the lung and intestine, the presence of tuberculosis of the intestinal lymphatic glands is no proof that the first infection occurred in the intestine, but believes it more probable that intestinal tuberculosis follows previous tuberculosis of the lungs, probably as a result of the swallowing of infected mucus from the lungs. The infected lung is also an important source of tuberculosis of the liver and peritoneum. Infections of the uterus and udder show a close connexion and generally follow peritoneal tuberculosis. Tubercle bacilli may be present on the mucous membrane of the respiratory or intestinal tracts or of the vagina without the presence of lesions. Support is given to the view that tubercle bacilli are only occasionally found in the blood and then only in small numbers and for a short period. The skeletal musculature is practically always free. The organ disposition of tuberculosis is determined partly by the reticulo-endothelial content of the organ and partly by the lymph flow.—A. W. S.

RAUTMANN, H. (1935). Ein Beitrag zur Pathogenese der Kälbertuberkulose auf Grund der Fleischbeschaubefunde in der Provinz Sachsen. [**A Contribution on Calf Tuberculosis based on the Meat Inspection Reports in the Province of Saxony**].—*Tierärztl. Rdsch.* **41.** 367-372. 2 tables. [2 refs.]

The author gives details of the examination of the carcasses of 173 calves all of which were affected with tuberculosis. The ages of the calves were 2 under 8 days, 43 less than 2 weeks, 86 of 2 to 4 weeks, 35 over 4 weeks and 7 of unknown age ; 158 indicated that infection had been derived *via* the placenta, 13 by inhalation and 2 (1 definitely) by ingestion. Rautmann states that in cases where the disease was contracted by inhalation the lesions had assumed macroscopic dimensions in

six-week-old calves, calcified lesions being obtained in one case. 150 out of the 158 which he attributes to placental infection also showed lung lesions and he considers that, in all cases where lung lesions are present, they are always secondary to the liver lesions and that infection is carried to the lungs in the foetal blood supply, the bacilli being arrested there. The author traced 70 of the dams of the calves and took scrapings from the uterus ; positive results were obtained in 44 cases. He considers that the age of the calf and the extent of the disease are valuable guides to the health of its dam. He also considers that tuberculosis can be present in the uterus and yet no signs be found in the lungs. He places the sources of calf tuberculosis in the following order of importance :– (1) infection from the dam *via* the placenta ; (2) inhalation, and (3) ingestion. He considers that ingestion only plays a very minor part and that, even if it does not, any lesions present in the intestines and their associated glands are so indefinite that they are not recognizable as tuberculous lesions.—G. Dods Munro.

I. Röhrer, H. (1935). Ueber ein gehäuftes Auftreten von primärer Vulvatuberkulose des Rindes. [**An Outbreak of Primary Vulvar Tuberculosis in Cattle**].—*Z. InfektKr. Haustiere.* **47.** 120-137. 6 figs., 2 tables. [9 refs.]

II. Röhrer, H. (1935). Primäre Penistuberkulose und primäre Vulvatuberkulose beim Rind. [**Tuberculosis of the Penis and Vulva of Cattle**].—*Berl. tierärztl. Wschr.* **51.** 115-117. [10 refs.]

I. Seven cases are described of cows showing primary tuberculosis of the vulva. In two instances there was marked local enlargement of the labia, whilst in the other cases nodules could be recognized buried in the submucosa. A certain degree of spread along the genital tract had taken place in every case whilst the neighbouring lymphatic glands also showed involvement. Udder tuberculosis was not noted in any case. The histological appearance of lesions is described. In one case infection had spread as far as the thoracic cavity. These cows had all been served by a bull suffering from tuberculosis of the genital tract.

II. The same cases are described.—E. J. Pullinger.

van Heelsbergen, T., & Clarenburg, A. (1934). Bijdrage tot de kennis van het Röckl'sche granuloom bij het rund. [**Roeckl's Granuloma in Cattle**]. —*Tijdschr. Diergeneesk.* **61.** 621-633 and 684-695. 7 figs. [41 refs.] [English, French and German summaries : abst. from orig.]

The authors deal extensively with the literature of Roeckl's granuloma in cattle, and report a case of this disease in a seven-year-old cow. It is remarkable that in this case the lesions were also present in the kidneys. Although bacteriological investigations and inoculations in guinea pigs, rabbits, fowls and a calf did not give any results, the authors are of the opinion that infection with bacilli of avian tuberculosis cannot be excluded from the aetiology. Comparing American cases of " skin and subcutaneous lesions " with Roeckl's granuloma, it is evident that there are distinct differences between these two conditions.

—J. van der Hoeden (Utrecht).

Hornby, H. E. (1934). **Bovine Tuberculosis in Tropical Africa.**—*E. Afr. med. J.* **11.** 9-16. [5 refs.]

The author quotes from several reports to show that tuberculosis is generally regarded as a comparatively unimportant disease in central Africa. He also states that, in some countries, this complacency is being displaced by anxiety regarding the future and refers to the findings of Curasson in French West Africa, Manley in Nigeria, Purchase in Northern Rhodesia and to the reports from Madagascar.

Discussing the low incidence of the disease in Tanganyika Territory, Hornby states that this is not altogether due to the climate, which varies considerably in different districts. He states that the weight of evidence is in favour of the view that native races of cattle, particularly the zebu, are more resistant to infection than European cattle, and that the open-air life which the majority of native cattle lead probably also contributes to the low incidence of the disease. Open-air life cannot be regarded as the sole or main factor in the incidence of tuberculosis in tropical Africa.—GWILYM O. DAVIES.

DATTA, S. C. A. (1935). **Prevalence of Tuberculosis among Cattle in India.**—*Indian vet. J.* **12.** 8-11. [13 refs.]

This short article reviews the literature upon bovine tuberculosis in India and shows that the incidence of the disease is becoming a serious economic factor in certain districts. " No-lesion tuberculosis ", as described by SOPARKAR (1929), has been found in several cattle cases and in guinea pigs used for test purposes at Muktesar, where two clinical cases of bovine mastitis have also been recently diagnosed. The latter are said to bring the recorded number of such cases in cattle and buffaloes in India since 1898 to eight.—C. V. WATKINS.

ELVINGE, F. (1935). Om Knogletuberkulosen hos Svinet. [**Bone Tuberculosis in Swine**].—*Maanedsskr. Dyrlaeg.* **46.** 544-547.

The figures given in this article are recorded from meat inspection at an abattoir from January, 1933, to November, 1934, and show the incidence of bone tuberculosis in swine. Special mention is made of a number of such cases detected, after the ordinary inspection, by a special examination, in which longitudinal sections were made of the bodies and spinous processes of those vertebrae that had remained whole after the carcass had been split during the course of dressing. Altogether 81,420 carcasses were inspected during the period, of which 6,240 were found to be tuberculous. Of these, 675 cases showed lesions in the bones, of which 196 (29·04 per cent.) were only detected by means of the special examination. Carcasses showing generalized tuberculosis are not included in these figures. The author remarks that out of these 196 carcasses, 107 would have been stamped First Grade and 86 Second Grade if the special examination had not been carried out.
—GUSTAV NAERLAND (FARSUND).

MORAX, V., & NIDA, M. (1935). Inoculations oculaires expérimentales des différentes souches de bacilles tuberculeux. [**Intra-Ocular Inoculation of Different Strains of Tubercle Bacilli**].—*Ann. Inst. Pasteur.* **54.** 556-583.

Intra-ocular injections into the rabbit of virulent bovine strains, attenuated bovine and human strains, and BCG gave rise to essentially different lesions.

Virulent bovine strains provoked extensive and progressive lesions which ultimately reached the lungs and proved fatal in from seven to 13 months.

With BCG and other avirulent strains the lesions varied according to the dose, but in all cases they were localized and never manifested any tendency to invade the rest of the body. In the case of BCG the authors failed to transfer to healthy animals infection from the lesions which developed in the inoculated rabbits, even though large doses were used for the primary inoculations.

Working with dissociated strains of the bovine and avian organism and BCG, the authors found that R strains behaved like cultures containing both R and S forms, but S strains under the same conditions seemed deprived of pathogenic power. When the doses of the smooth strains were increased, lesions were provoked but these were always localized and without any invasive tendencies.

Premunition experiments with BCG showed that the majority of rabbits which had received one intra-ocular injection of BCG did not reveal any greater resistance to a virulent bovine strain than did the controls.—GWILYM O. DAVIES.

WIGHT, A. E. (1935). **Progress and Status of Coöperative Tuberculosis Eradication Work.**—*J. Amer. vet. med. Ass.* **86.** 368-374.

The survey to determine the extent of bovine tuberculosis in the United States of America, completed on May 1st, 1934, indicated that the approximate average degree of the disease among cattle had been reduced to 1·1 per cent. from 4 per cent. in 1922. This reduction is due to intensive work on the control of tuberculosis with the aid of state funds. The number of accredited herds has slightly increased, although interest in the scheme has lessened in certain states. In the state of New York, which has the most accredited herds, the retesting is carried out by practitioners at the state's expense. A retest of 36,000 cattle in the state of Minnesota, which is a modified accredited area, showed only 26 reactors, located in 17 herds. The tuberculin used is Dorset's " Special F " tuberculin produced by the Bureau of Animal Industry.—NORMAN BISSET.

HAUPT, H. (1935). Das Bangsche Verfahren beim Kampfe gegen die Rindertuberkulose in Deutschland. [**The Bang Control Method for Bovine Tuberculosis in Germany**].—*Tierärztl. Rdsch.* **41.** 335-340.

The author supports the use of Bang's method of controlling tuberculosis. Bang's method, it will be remembered, consists of the removal and slaughter of all clinical cases of tuberculosis, an attempt being made to salvage such parts of the carcass that can be used. The remaining cattle are subjected to the tuberculin test and reactors are segregated. No cattle which have not passed the tuberculin test are admitted to the clean herd, which must be retested twice or more a year. Calves of reactors are removed from their dams at birth and are fed on pasteurized or other tuberculosis-free milk. Such calves must pass the tuberculin test before being admitted to the clean herd. Bulls used for serving cows of the clean herd must have passed the tuberculin test.—E. J. PULLINGER.

—. (1934). Amtliche Verlautbarungen. Tilgung der Rindertuberkulose. [**Report on Eradication of Bovine Tuberculosis, and Regulation for Tuberculin Test and BCG Vaccination – Czechoslovakia**].—*Prag. tierärztl. Arch.* **14.** 192-199.

Preliminary investigations with BCG vaccination, combined with hygienic measures, for the eradication of tuberculosis have given very promising results. In consequence, a more extensive field investigation is to be carried out. In this case the cost of vaccination is to be borne by the farmer.

When permission for vaccination has been obtained, all calves must be removed from their dams at birth and transferred to a clean, disinfected stall. They must be fed upon milk known to be free from *Mycobact. tuberculosis*, or upon boiled milk. The feeding of colostrum must not be permitted. As soon as possible after birth, certainly within 15 days, calves must be vaccinated with 10 c.c. of BCG vaccine. They must be retained in isolation for 30 days, after which they must be transferred to the herd of negative tuberculin reactors if one exists, otherwise to the general herd. In the case of vaccinated animals a positive reaction to the tuberculin test is to be considered an indication of immunity, not of infection. Vaccinated calves will be revaccinated yearly for five years and must be continually under observation. When such an animal dies, the *post-mortem* examination must

be rigorous and, when possible, must include an extensive histo-pathological examination. Concurrently with vaccination of calves, ordinary hygienic control measures for tuberculosis must be carried out. A campaign must also be instituted to educate the stockowner so as to ensure his co-operation in control measures.

Regulations are laid down for the technique to be adopted in carrying out the ophthalmic, subcutaneous, intradermal, combined intradermal and ophthalmic, intrapalpebral, and scarification tests in order that uniformity in testing may be ensured. An attempt must also be made to standardize the reading of the tests. The tests must be compared to ascertain which is of most value for use in the eradication campaign.—E. J. PULLINGER.

PRÖSCHOLDT, O. (1935). Ermittelung, Erhaltung und Schaffung tuberkulosefreier Rinderbestände. [**Management of Tuberculosis-Free Herds**].—*Dtsch. tierärztl. Wschr.* **43.** 49-56. [10 refs.]

Pröscholdt discusses the measures which can best be taken for the development and maintenance of tuberculosis-free herds. Recognizing the vastness of the problem, which is similar to that which exists in Great Britain, and the impossibility of any general scheme of eradication at the present time, he recommends that the measures at present in force under the voluntary eradication scheme be strengthened, particularly by the much more extensive use of the tuberculin test. He believes, however, that, in order to cover the possible errors of this test, careful clinical examination including the examination of bronchial mucus should be carried out in the case of all cattle used for breeding. The campaign should be conducted in all herds which, from milk control examinations or in other ways, are believed to be fairly free. In herds in which the percentage of infection proves to be low, all suspected animals should be removed as soon as possible ; open cases should be removed at once. Official recognition of freedom would follow two negative herd tests with a six-month interval. In more heavily infected herds, Ostertag's method should be followed, but should be made more strict. Particular care should be taken to protect young animals from infection in order to build up a new tuberculosis-free herd. This should be kept entirely separate from the older cattle and tuberculin tested half yearly. Where facilities exist, two herds could be formed amongst the older cattle on the basis of tuberculin tests and clinical examination. Bronchial mucus should be tested in the non-reacting section for safety, and in the reacting section in order that the danger of infection spreading may be decreased by the removal of all open cases. Emphasis is laid on the necessity of avoiding reinfection of the susceptible tuberculosis-free herd through introduction of infected animals, and particularly by skim milk, etc., returned from creameries. The heating of all such products should be made compulsory as soon as possible.—A. W. STABLEFORTH.

GEROSA, G. (1934). Considerazioni sui rilievi fatti nelle aziende agricole della provincia di Pavia. [**Experience with BCG on Cattle in the Province of Pavia (Italy)**].—*Notiz. Ist. antituberc. Milano.* **12.** 116-131. 1 table.

At a meeting held at the Istituto Vaccinogeno Antitubercolare, Milan, to discuss the value of BCG, the opinion was expressed that it was dangerous and of little use. In this article, the author has replied at length to these criticisms and to the later reports of the inefficiency of the vaccine.

In one carefully controlled experiment a number of calves were vaccinated with BCG and one month later placed in contact with open cases of tuberculosis for a year. In no case did a vaccinated animal develop tuberculosis. Statistics collected from a number of farms show that at least 50 per cent. of the vaccinated

animals escape infection. The author refers to factors – tuberculosis contracted *in utero*, intercurrent banal illness, etc. – that may adversely affect the reaction of inoculated animals. It must also be remembered that BCG does not produce immediate resistance to tuberculosis and that calves should be strictly isolated for a week or two after vaccination. The author is satisfied that BCG is harmless and serves a useful purpose in the control of tuberculosis in the field.—J. A. N.

GENTILI, E. (1934). Ancora sulla vaccinazione contro la tubercolosi in Provincia di Pavia. [**Experience with BCG on Cattle in the Province of Pavia (Italy)**]. —*Notiz. Ist. antituberc. Milano.* **12.** 132-137.

For the past eight years the author has studied the effects of BCG vaccine on young cattle kept under ordinary farming conditions. The majority of vaccinated animals did not develop tuberculosis although animals from infected sources were often introduced into the farms. Vaccination was stopped on one farm after the Lübeck fatalities and it was noticeable that the young unvaccinated stock did not develop so well or so quickly as vaccinated animals. Amongst other reasons why some animals fail to develop a resistance to tuberculosis after vaccination, are the observations that calves which are already suffering from tuberculosis or some other infection are unable to react to BCG and that the vaccination is often carried out improperly. Experiments have shown that BCG protects calves which have been fed for the first 40 days of life on milk free from *Mycobact. tuberculosis*. The author concludes that BCG is harmless, practical and efficacious.—J. A. NICHOLSON.

JUNDELL, I., & MAGNUSSON, H. (1935). Nouvelles recherches concernant l'action du BCG sur le porc. [**New Research Work on the Action of BCG on Swine**]. —*Ann. Inst. Pasteur.* **54.** 332-340.

Previous experiments by the authors, confirmed by HAYES, HARING, and TRAUM in the United States of America, appeared to show that vaccination of swine with BCG is ineffective. This article describes further experiments undertaken to find whether the avenue of inoculation is of special importance, and, also, whether the action of the BCG might be reinforced by later administration of attenuated or avirulent cultures of the ordinary bovine strains of tubercle bacilli. It was found that swine inoculated with BCG *per os*, or subcutaneously, showed no reaction to tuberculin four weeks after inoculation but that, if a second inoculation was practised five weeks after the first, the majority of the animals reacted to tuberculin five weeks later. Two vaccinations, at an interval of six weeks, with BCG alone did not prevent the development of tuberculosis, but subcutaneous vaccination with BCG followed by the administration in the food of large quantities (1 g. of culture on each of two occasions at nine days' interval) of some other strain of avirulent tubercle bacilli of bovine origin, appeared to create a certain amount of resistance to virulent infection. The authors, however, admit that their researches on this particular problem require repetition.—NORMAN BISSET.

NÈGRE, L. (1935). Prémunition antituberculeuse du cobaye et du lapin nouveaunés au moyen du BCG absorbé par la voie buccale. [**Premunition by the Buccal Route against Tuberculosis with BCG in New-Born Guinea Pigs and Rabbits**].—*Ann. Inst. Pasteur.* **54.** 697-707. [5 refs.]

It is shown that the relative resistance set up in newly born guinea pigs by the ingestion of 4 to 6 cg. of BCG can be demonstrated equally well by an ocular test dose as by the ingestion of virulent organisms.

It is also shown that greater protection is obtained by giving a stated quantity of BCG in several small doses than in a single dose, and that little advantage is

gained by increasing the dose. The resistance which follows the ingestion of BCG can also be reinforced by multiple small doses subcutaneously.—G. O. D.

CHARGAFF, E., & SCHAEFER, W. (1935). Analyse sérologique des différentes fractions lipoidiques du BCG. [**Serological Analysis of the Lipoid Fractions of BCG**].—*Ann. Inst. Pasteur.* **54.** 708-714. 2 tables. [9 refs.]

The authors' results show that only phosphatide of the lipoid fractions of BCG (phosphatide, fat and wax) has revealed evidence of *in vitro* and *in vivo* antigenic activity.—GWILYM O. DAVIES.

MØLLGAARD, H. (1934). Untersuchungen über die biologischen Eigenschaften und die pathogene Wirkung der sogenannten nicht saürefesten Tuberkelbazillen. [**The Biological Properties and Pathogenicity of So-Called Non-Acid-Fast Tubercle Bacilli**].—*Beitr. Klin. Tuberk.* **85.** 616-663.

Møllgaard states that the non-acid-fast forms obtained by him from tuberculous lesions and described previously [(1931) and (1932). *Beitr. Klin. Tuberk.* **77.** 83 and this *Bull.* **3.** 589.] are not tubercle bacilli and have no genetical connection with this organism. Referring to them as *Actinomyces alba polyarthridis*, he claims that they can be very frequently isolated from tuberculous processes together with *Mycobact. tuberculosis*, that the actinomyces is also pathogenic and that it intensifies the action of *M. tuberculosis* and *vice versa*. He concludes that the cause of tuberculosis is twofold, *M. tuberculosis* being responsible for the specific granuloma and the actinomyces for non-specific inflammatory changes. More than 90 per cent. of tuberculous patients in a sanatorium gave cutaneous reactions to the toxin of one form of this organism. Details are given on the morphology of the actinomyces described.—A. W. STABLEFORTH.

RHINES, C. (1935). **The Longevity of Tubercle Bacilli in Sewage and Stream Water.**—*Amer. Rev. Tuberc.* **31.** 493-497. 2 tables. [6 refs.]

The author carried out experiments to ascertain the survival period of tubercle bacilli in sewage and stream water. A strain of avian bacillus was used for the experiments. A suspension of the bacilli was added to 10 c.c. of sewage or stream water and kept in test tubes in a dark place at room temperature during the summer months. The number of surviving tubercle bacilli was determined by treatment with a 2 per cent. sodium hydroxide solution for ten minutes followed by plating on crystal-violet glycerin agar. In sewage the tubercle bacilli were reduced from an initial number of 49 thousand per c.c. to 140 per c.c. after 93 days and in stream water from 48 thousand to 9,400 in the same time. From this the author concludes that this strain of avian tubercle bacillus was capable of resisting the conditions in sewage or stream water for at least three months.—BRENNAN DEVINE.

BRANDT, A. J. (1935). Om kulturell typedifferentiering av tuberkelbaciller, spesielt ved dyrkning på Petragnanis substrat. [**Differentiation of Tubercle Bacilli by Petragnani's Medium**].—*Norsk VetTidsskr.* **47.** 1-22. 2 figs., 2 tables. [5 refs.] [English and German summaries : abst. from orig.]

The work described in this article is carried out in connexion with a series of investigations by HOLTH [this *Bull.* **5.** 684.] in order to determine the types of bacilli found in tuberculous lesions in swine. For this purpose, HOLTH employed the direct inoculation method of experimental animals and the author has now used the same material for cultural differentiation on Petragnani's medium.

He first gives a review of earlier investigations on the subject and then gives a detailed description of the preparation and technique for the use of the medium.

Of the 51 samples tested, 43 gave sufficient growth on this medium to be used for purposes of differentiation and confirmed the findings of HOLTH. Acid-fast bacilli were demonstrated by microscopic examination of the same 43 samples. On the other hand only 31 out of the 51 samples produced lesions when inoculated into rabbits and guinea pigs. It must be noted, however, that material for the animal inoculation experiments was taken first from the lesions so that, in many cases, there was but little left for cultural inoculations. As a rule, it was rather difficult to ascertain the type of bacillus from the primary cultures and the results had, therefore, to be read from the first or second subcultures. The growths were then quite characteristic and remained practically so on a further ten to 12 subcultures. Only the human and avian types were present in this series, the former in three and the latter in 40 cases.—GUSTAV NAERLAND (FARSUND).

STEENKEN, W., Jr. (1935). **The Influence of the pH on Dissociation of *B. friedländer* and *M. tuberculosis*.**—*J. infect. Dis.* **56.** 273-276. 2 tables. [9 refs.]

The author shows that an acid pH favours the dissociation of Friedländer's bacillus. *Mycobact. tuberculosis* under similar circumstances becomes attenuated whereas, in a buffered alkaline synthetic medium, its pathogenicity is retained. Acid glycerol bile potato medium favours the attenuation of BCG, and the author suggests that if it were grown on buffered synthetic medium for a year or more its virulence might be regained. This is based on the assumption that the attenuated " R " variant always contains some " S " component which would develop under favourable conditions.—GWILYM O. DAVIES.

THOMAS, R. M., & DURAN-REYNALS, F. (1935). **The Degree of Dispersion of the Bacillus as a Factor in Infection and Resistance in Experimental Tuberculosis.**—*J. exp. Med.* **62.** 39-64. 1 text fig., 7 figs. on 3 plates, 9 tables. [14 refs.]

The authors studied the effect of testicle extract on the dispersion of tubercle bacilli when injected intradermally into laboratory animals. It was found that the addition of testicle extract resulted in an enhancement of the local lesion. In the case of bacilli virulent for the animal used, there was also an acceleration in the rate at which visceral lesions developed. In the case of non-virulent strains, no extension to the viscera occurred, despite the development of a large local lesion. The partial immunity conferred upon guinea pigs and rabbits by intradermal vaccination with heat-killed tubercle bacilli was found to be increased when testicle extract was added to the vaccine.—F. BLAKEMORE.

SMITHBURN, K. C., & SABIN, Florence R. (1935). **The Cellular Reactions to Acetone-Soluble Fat from Mycobacteria and Streptococci. The Effect of Neutralization on the Biological Activity of the Tuberculo-Lipoid and of the Phthioic Acid Derived from it.**—*J. exp. Med.* **61.** 771-782. 8 figs. on 2 plates, 3 tables. [14 refs.]

The reaction of the animal body to various extracts of tubercle bacilli is recapitulated. Thus the phosphatide fraction induces the production of masses of epithelioid cells and Langhan's giant cells. The unsaponifiable wax causes an extensive reaction of foreign body giant cells, monocytes and young connective tissue cells. The third lipoidal component is an acetone-soluble fat from which phthioic acid and other fatty acids may be derived. This substance when injected into a normal animal produces a profound reaction involving every type of connective tissue cell ; haemorrhages, adhesions and tuberculous tissue also occur, the extent of the reaction being roughly proportional to the amount of material injected.

Neutralization of the acetone-soluble fat renders the resulting tissue reaction less extensive, but the tuberculogenic activity remains unchanged. Acetone-soluble fatty extracts of streptococci are very irritating to body tissues, but they are not tuberculogenic.—E. J. PULLINGER.

MILLER, W. T. (1934). **Erythrocyte, Leucocyte and Hemoglobin Determinations on the Blood of Cattle, with a Note on the Blood in Johne's Disease.**—*Rep. N. Y. St. vet. Coll. 1932-1933.* pp. 71-80. 4 tables. [21 refs.]

Five herds of cattle of different breeds, consisting of 56 adults and 30 heifers and calves, were examined over a period of 18 months. Adult animals showed an average haemoglobin percentage of 87·1, the standard being human blood containing 13·8 g. per 100 c.c. of blood. The erythrocyte count for adults averaged 6,325,000 and leucocytes 8,616. In younger animals the values were higher and appeared to decrease with the approach of maturity.

Breed, lactation, pregnancy and management had no influence on the results. Three animals clinically affected with Johne's disease revealed no marked variations.—GWILYM O. DAVIES.

MINETT, F. C. (1935). **The Diagnosis of Johne's Disease by the Use of Johnin.** —*J. comp. Path.* **48.** 125-137. 1 table. [9 refs.]

In this article an account is given of 59 cattle, of which 53 had reacted – many of them on more than one occasion – to the double intradermal test, using concentrated johnin prepared on a Sauton synthetic medium. Thirty-nine of the 53 were conclusively proved *post mortem* to be infected with Johne's disease, while there was presumptive evidence of this infection either from *post-mortem* examination or from the history of the case in 11 of the remaining 14. In three early cases a positive diagnosis was reached by cultural methods only, the examination of films and of sections of the intestine being negative. Six of the 59 animals did not react to johnin but were found to be affected with Johne's disease *post mortem* ; of these, three were tested once only and four were at an advanced clinical stage. *Post-mortem* examination for tuberculosis indicated that the reactions to johnin were unconnected with tuberculous infection.

Repeat tests with johnin on a number of the animals showed much variation in the degree of local response, a result which is attributed to variations in the allergic state.

RICHTERS, C. E. (1935). Das Vorkommen echter Diphtheriebazillen bei der Druse der Pferde. [**The Occurrence of** *Corynebacterium diphtheriae* **in Strangles**].—*Berl. tierärztl. Wschr.* **51.** 401-406. 5 text figs., 4 figs. on 1 plate. [10 refs.]

Pus, collected in a sterile manner from horses suffering from purulent conditions including strangles, was sometimes found to contain a Gram-positive diphtheria-like bacillus. The pus was obtained not only from nasal exudates but also from unbroken glands. Out of 152 samples of pus, 15 contained this organism which was obtained in pure culture eight times.

The organism was tested by cultural and serological means and by inoculation experiments into guinea pigs and horses. In all respects the majority of the strains resembled human strains of *Corynebact. diphtheriae.*

Three foals were inoculated with equine strains of diphtheria bacillus. One strain which had proved apathogenic for guinea pigs was equally harmless to the foal. The other two strains produced a catarrhal inflammation of mucous membranes with the formation of fibrinous exudate.

The epidemiological significance of the occurrence of the diphtheria bacillus in horses is discussed.—E. J. Pullinger.

Carpano, M. (1934). **Ulcerous Dermatitis of Ruminants and its Relation to Diphtheria of Man.**—*Bull. Minist. Agric. Egypt.* No. 135. pp. 48. 20 figs. on 12 plates, 7 tables. [59 refs.]

This paper deals with a specific dermatitis of ruminants caused by an organism identical with *Corynebact. diphtheriae*, the causal agent of human diphtheria. The epizootic, clinical and anatomo-pathological data are given, together with the bacteriology of the isolated organisms.

The disease chiefly affects young bovines and buffaloes, and the lesions take the form of discrete nodules in the substance of the skin, appearing first on the shoulders, back and sides. These nodules may develop into large pustules or form large ulcers. The lesions are not usually accompanied by systemic disturbances. The causal organism is pathogenic for cats, dogs, guinea pigs and several birds. According to the author, the morphological, cultural and biological properties of the organism have shown it to be identical with *C. diphtheriae*. This is supported by crossed active and passive immunity experiments made with the organisms and their exotoxins.

The author concludes by discussing the significance of the above findings in particular relation to public health; he points out the grave danger that such animals could act as reservoirs of infection and transmit infection to man either by direct contact or through the channel of milk or milk products.—G. O. D.

Bull, L. B., & Dickinson, C. G. (1934). **The Influence of Skin Wounds made during Shearing on the Incidence of Caseous Lymphadenitis in Sheep.**—*J. Coun. sci. industr. Res. Aust.* **7.** 201-202. 1 table.

Thirty-eight male lambs were castrated by crushing the spermatic cords with Burdizzo pincers. Their tails were not cut off and each year they were shorn very carefully with hand shears. At three years of age these sheep were slaughtered and the degree of infection with caseous lymphadenitis was compared with that in three-year-old wethers running under similar conditions but in which the above mentioned precautions against wounding were not taken. Only one of the 38 was infected, as compared with an incidence of infection of approximately 30 per cent. in the controls.—W. I. B. Beveridge.

Haupt, H. (1934). Bacterium pfaffi Hadley 1918 = Bacillus pseudotuberculosis Eisenberg 1891.—*Zlb. Bakt. I.* (*Orig.*). **132.** 349. [In German].

The author points out that *Bact. pfaffi* Hadley, 1918, is synonymous with *B. pseudotuberculosis* Eisenberg, 1891 [now *Corynebact. pseudotuberculosis*], and not with *Salmonella* (formerly *Bact.*) *gallinarum* or any variant of this organism, as is believed by certain authors.—D. R. Wilson.

de la Villa, G. C. (1934). Nota sobre la sensibilidád del pájaro al bacilo Erysipelothrix rhusiopathiae. [**Susceptibility of Birds to** *E. rhusiopathiae*].—*Trab. Inst. Biol. anim. Madr.* **2.** 330-331. 1 table.

The mouse is the most susceptible of laboratory animals to *E. rhusiopathiae*, then the pigeon and the rabbit. The pigeon is used for demonstration of the organism in bacteriological laboratories, while the mouse, pigeon and rabbit are used for testing serum.

As the author had not enough of these animals to carry out his experiments, he used birds which could be obtained cheaply. He tried different species of

*Fringilidae*. The first tests, with sparrows, were not successful, as these birds do not live long in captivity and the results were therefore unreliable. He therefore chose greenfinches (*Fringilla chloris*), which will live in captivity. The organism used killed pigeons of 250 to 300 g. weight in 72 hours, if given in 0·001 c.c. doses. Fourteen greenfinches of average weights of 30 g. were given injections of 0·25 c.c. of different dilutions of a 48-hour broth culture into the pectoral muscles. All the birds died at intervals between 46 and 75 hours after the injections, and all showed the characteristic lesions of the disease. The dilutions varied from one in five to one in five million.

In view of the above experiments, the author considers that these birds may be used instead of pigeons and mice for testing products containing *E. rhusiopathiae*.

Balfour-Jones, S. E. B. (1935). **A Bacillus Resembling *Erysipelothrix muriseptica* Isolated from Necrotic Lesions in the Livers of Mice.**—*Brit. J. exp. Path.* **16.** 236-243. 4 tables. [4 refs.]

Routine examinations of dead mice from stock revealed that some had small, discrete, greyish-white necrotic areas in the liver. Conjunctivitis was sometimes present and also a gelatinous appearance of abdominal organs.

From these mice an organism closely resembling *E. muriseptica* was isolated, and it proved to be serologically, culturally and morphologically indistinguishable from *E. rhusiopathiae*. The organism was virulent for mice by injection and, provided the mice were previously starved, also by feeding.—Gwilym O. Davies.

Brigham, G. D., & Rettger, L. F. (1935). **A Systematic Study of the Pasteurella Genus and Certain Closely Related Organisms.**—*J. infect. Dis.* **56.** 225-237. 1 table. [25 refs.]

This is a comparative study of various pasteurella strains of animal origin. Seventy-eight strains were obtained from different sources, but 24 were excluded on the grounds of variable motility, Gram-staining or the presence of other atypical features.

The true pasteurella strains were morphologically identical and sometimes exhibited bipolar staining. It would appear that this staining feature has serious limitations as a classification criterion.

The organisms do not grow on potato or liquefy gelatin. Indol is produced. No visible change occurs in litmus milk. Acid but no gas is produced in glucose, saccharose and mannitol and the organisms are methyl red and Voges-Proskauer negative.

It was not found possible to type the strains serologically, nor was a bacteriophage isolated from any of the cultures. Filtrable forms could not be demonstrated.

*Past. pestis* and *Past. pseudotuberculosis* strains were distinguishable by their inability to ferment saccharose, by not producing indol and their ability to grow on potato at 20°C. *Past. pseudotuberculosis* is peculiar in that it is motile at 25°C. or below, and in producing alkalinity in milk.

The tularaemia organism appears to be more closely related to the brucella than to the pasteurella genus. Cystine is necessary for its growth and its sugar fermentation reactions are very variable.—Gwilym O. Davies.

Sívori, F. (1934). La septicemia hemorrhagica de los bovinos en la republica Argentina. **[Haemorrhagic Septicaemia of Bovines in the Argentine Republic].**—*Rev. Med. vet., B. Aires.* **16.** 26-45.

The author traces the origin of the conception that a disease entity with characteristics corresponding to those of haemorrhagic septicaemia exists in the

Argentine. In 1886 a disease of young bovines was investigated and was shown to be parasitic gastro-enteritis ; later investigators pointed out the absence of parasites in some cases of this disease, and these were classed as haemorrhagic septicaemia. In 1898 the sub-visible genera *Nematodirus*, *Trichostrongylus* and *Ostertagia* were recognized for the first time, and the author's view is that the disease referred to as haemorrhagic septicaemia in the early literature is parasitic gastritis caused by these worms. He advocates the discontinuance of the use of pasteurella vaccines until these organisms are more conclusively incriminated.

From an analysis of literature dealing with the disease he expresses the opinion that there is serious doubt as to its existence in cattle and swine in other countries. —R. S. Roberts.

Kolayli, C., Mavrides, N., & Arayedji, E. (1935). Préparation du sérum contre le choléra aviaire chez le boeuf. [**Preparation of Fowl Cholera Antiserum in Cattle**].—*Rev. gén. Méd. vét.* **44.** 265-266.

The authors show that the serum of cattle hyperimmunized against fowl cholera is equally as effective for immunizing poultry as that procured from horses and donkeys.

Cattle were injected subcutaneously with a dose of dead organisms followed by weekly increasing doses of pure broth cultures up to a dose of 100 c.c. ; 3 c.c. of this bovine serum protected fowls against a fatal dose of culture injected eight hours later.—Gwilym O. Davies.

Jansen, J. (1934). Paratyphus bij eenden. (Eendensterfte, voedselvergiftiging bij den mensch, bestrijding). (Voortgezette determinatie van 7 Gärtner-stammen). [**Paratyphoid in Ducks**].—*Tijdschr. Diergeneesk.* **61.** 1247-1255 and 1309. 3 tables. [12 refs.] [English, French and German summaries : abst. from orig.]

The typing of nine strains of salmonella, cultivated from an outbreak in ducklings and from eight ducks suffering from oöphoritis, demonstrated that seven of them belonged to the Gärtner group and two to the Breslau type. Using sera with low agglutinin titre, the serological relationship between *Salmonella enteritidis* and *S. pullorum* could be shown. However, no such relationship could be found between *S. pullorum* and the Breslau type of salmonella. The fresh blood agglutination method with Gärtner organisms was useful in the only case examined of paratyphoid in ducks.

In a second series of investigations, using fermentation reactions advocated by Kaufmann, it became evident that these seven strains of *S. enteritidis* all belonged to the Moscow type. Gas formation in dulcite only appeared after a few days.—J. van der Hoeden (Utrecht).

Cernea, J. (1934). Asupra unei epizootii de paratifoză la porumbei. [**An Outbreak of Paratyphoid in Pigeons**].—*Arhiva vet.* **26.** 119-125. 1 table. [6 refs.] [Abst. from French summary].

A discussion on an outbreak of *Salmonella typhi-murium* infection in pigeons, which ran a peracute course in birds of all ages. On examination of the flock, 31 per cent. of the pigeons showed a positive blood agglutination reaction against the actual strain isolated from the outbreak. A heat-killed vaccine was prepared and applied to all pigeons, both to positive and negative reactors ; 29 per cent. of the former died of paratyphoid after vaccination but none of the latter died.—J. E.

Konno, T., & Goto, Y. (1934). **Precipitins in the Blood in *Salmonella pullorum* Infection.**—*9th Rep. Govt Inst. vet. Res. Fusan, Japan.* pp. 56-62 of Pt. 1. 5 tables. [In Japanese : abst. from German summary, pp. 7-8 of Pt. 2].

The authors tested the rapid whole-blood agglutination test and the precipitation test for *S. pullorum* infection in fowls and found that the results with the precipitation test agreed closely with those of the agglutination test : in some cases where both tests were negative, cultures of *S. pullorum* were still obtainable.—J. E.

Burrows, W., & Jordan, E. O. (1935). **Oxidation-Reduction Potentials in Salmonella Cultures. I. The Development of Potential Levels Characteristic of Species.**—*J. infect. Dis.* **56.** 255-263. 4 figs., 2 tables. [5 refs.]

The salmonella group has been extensively studied by the usual biochemical tests and by serological reactions. It seemed desirable to explore other methods of differentiation, and this paper deals with the determination of oxidation-reduction potentials produced in the cultures of a number of salmonella strains. The experimental evidence indicates that bacteria of the salmonella group are able to produce Eh values in their cultures that are constant for certain species, and that these species are significantly different from one another in this respect [for description of Eh values see this *Bull.* **1.** 238]. It is argued that there should be a correlation between the potential levels attained by a bacterial culture and its metabolic processes. The characteristic by which a bacterium is classified arises largely from its metabolic activities. This is obvious when classification is by fermentation reactions and true, though less obvious, when classification is by serological methods. The synthesis of serologically specific carbohydrates and proteins is a metabolic process, and it has been suggested that biological syntheses are reactions involving the transfer of electrons and, therefore, should yield oxidation-reduction potentials. Thus, different species of bacteria should bring about oxidation-reduction potentials different from one another. It is proposed to determine whether or not there is a correlation between the antigenic structure of bacteria of the salmonella group and the order in which members of the group may be placed in an oxidation-reduction potential " scale ".—R. Lovell.

Fitch, C. P., & Bishop, Lucille M. (1934). ***B. abortus* in the Bovine Udder and its Effect on the Chemical Composition of the Milk.**—*Cornell Vet.* **24.** 25-29. 1 table. [7 refs.]

Fitch and Bishop conclude that, in the 12 animals which they examined, *Brucella abortus* had not produced sufficiently extensive udder lesions to allow components of the blood plasma to filter into the milk. The chloride-lactose ratio showed no statistically significant increase over that of uninfected quarters and the catalase content was within normal limits. The reaction of the milk was in general not sufficiently alkaline to give a positive brom-thymol-blue reaction unless other organisms were present. The specific conductivity was not increased. Eight animals were examined once, and four twice. Thirty-four of the 48 quarters examined were infected with *Br. abortus*.—A. W. Stableforth.

—. (1935). Deutsches Reich. Rundschreiben des Reichs- und Preuss. Ministers des Innern an die Landesregierungen, betr. Bekämpfung des seuchenhaften Verkalbens. [**Germany : Circular on Control of Bovine Contagious Abortion**].—*Reichsgesundheitsblatt.* **10.** 243-248.

Müssemeier. (1935). Organisation und Durchführung der Abortus-Bang-Bekämpfung (freiwilliges staatl. gefördertes Abortus-Bekämpfungs-Verfahren). [**The Voluntary State Control Scheme for Bovine Contagious Abortion, Germany**].—*Dtsch. tierärztl. Wschr.* **43.** 214-219. [1 ref.]

Until about two years ago living vaccine was probably more widely used in Germany for the control of bovine contagious abortion than in any other country. The disease appears nevertheless to have spread, and since that time it has been evident that the view has been gradually adopted that vaccination is unsatisfactory and would be better replaced by an attempt to eradicate the disease. This feeling culminated in the adoption of a state assisted scheme for its control which came into force on April 1st of this year. The necessary testing of blood and milk samples is to be carried out by the provincial veterinary laboratories who are to receive 0·3 RM. for each of the first ten thousand cows whose owners join the scheme. The protection of herds which are apparently free from this disease is to be the first consideration. Into this category will come those herds which for one year or longer have had no case of contagious abortion. In such a herd all animals over one year old will be tested twice with a month's interval and the herd regarded as free if no animal is found which has an agglutination titre of more than 1 : 50, or which gives a positive complement-fixation result with 0·1 c.c. or 0·05 c.c. serum. Examinations of milk samples are also to be made and, if necessary, guinea pigs inoculated, a titre of 1 : 80 to be regarded as positive and 1 : 40 as doubtful. Full details of methods of testing are laid down.

A. Herds which are not Suspected.—In herds which are free or apparently free from infection, rules are laid down dealing with the advantages of raising home bred stock for maintenance :– the adequate heating of milk, skim milk, etc., from creameries ; the isolation of purchased animals ; the use of calving boxes, and precautions to be taken where jointly owned bulls or common land are used, etc. If an abortion occurs and is proved to be due to *Br. abortus*, the cow is, except in exceptional circumstances, to be sold or got rid of preferably by slaughter, and the whole herd tested then and a week later. If reactors are found, it is then treated as an infected herd. No vaccines or other so-called preventives may be used.

B. Herds Recognized as Abortion-Free (Free from Brucella Infection). —Herds will be officially named " abortion-free herds " where no contagious abortion has occurred for 12 months and no reaction has been detected at two tests with an interval of six months. " Abortion-free herds " must be tested twice a year and must carry out the provisions outlined in A.

C. Infected Herds.—Herds which are infected are to be attacked next, those which are apparently only slightly infected being taken first. Infected animals are to be removed if possible, or segregated as completely as the conditions permit. Dead vaccines are not advised but may be used where abortions are very frequent, or if three-quarters of the breeding stock are reactors. The use of living vaccine is forbidden, save (under yearly licence) in exceptional cases where the disease is running an acute course, and the animals are sold only for slaughter. Milk from such herds must not be distributed unless adequately heated. A list of vaccinated animals must be kept, and the veterinarian using the vaccine is required to point out to the owner the fact that permanent infection is likely, and also the advantages of eradication.

D.—Each provincial laboratory must appoint a veterinarian and adequate staff to deal specially with abortion. The actual herd control is to be carried out through the official whole-time veterinary officer for the district. Records are to be kept by the laboratory and the herd is to be inspected by the local practitioner and whole-time officer at least twice yearly, and reports made to the laboratory, whose abortion officer shall visit once yearly. The fee for testing blood samples shall be 15 to 20 pfg. and the practitioner's fee for taking blood samples 1 RM. per head for the first ten animals, with a decreasing fee for each further 20 up to 0·4 RM. for all over 50. A small mileage allowance is given.

Regulations are also made for the general prevention of the spread of contagious abortion, necessitating testing before sales and before sending to communal pastures, and forbidding the exposure or bulling of cows which have a genital discharge, or the use of infected bulls except in affected herds, etc. Cattle attendants from an infected farm may not work or help on another farm. The handling of abortion by unqualified persons is also forbidden.—A. W. Stableforth.

Wall, S. (1935). Metoder för bekämpandet av sjukdomen smittsam kastning hos nötkreatur. [**Methods for Combating Infectious Abortion in Cattle**].—*Skand. VetTidskr.* **25.** 27-57. 3 figs., 7 tables. [5 refs.] [English summary : abst. from orig.]

This is a general lecture in which the author discusses means for the eradication of bovine contagious abortion. The large amount of general information contained in the article is not readily abstractable, and the reader should consult the original article.

Dead vaccine has been much used experimentally and in the field in Sweden. Wall still recommends it in cases where it is desirable to procure immunity rapidly, such as in a herd free from infection or only slightly infected, when there is danger of infection, or in a heavily infected herd ; also as a general measure in such a herd for all the animals as yet uninfected as shown by the blood test. Live vaccine is also recommended in suitable conditions.

The author emphasizes the importance of co-operative effort, covering a village, district or province, when eradication is practised.

—H. C. Bendixen (Copenhagen).

I. Stenersen, H. (1935). Den nye felttogsplan mot den smittsomme kalvekasting. [**The New Campaign against Bovine Contagious Abortion in Norway**].—*Norsk VetTidsskr.* **47.** 31-50.

II. Wall, S. (1935). Offensiven mot den smittsamma kreaturskastningen. [**Plan of Control of Bovine Contagious Abortion in Norway**].—*Skand. VetTidskr.* **25.** 161-164.

I. The author discusses the new government regulations against bovine contagious abortion which came into operation on January 1st, 1935 ; the regulations are given *in extenso*. Chief stress is laid upon the prevention of further spread of the infection, government support being given to farmers who want to free their herds from the disease. Approximately £37,500 has been granted by the State for this purpose during the current year.

Some of the most important measures in this new campaign are :- compulsory notification ; registration of all infected herds by the Central Veterinary Office ; supervision over the whole campaign by the Director of the Civil Veterinary Services ; prohibition of movement from an infected herd on to common pastures, to markets, auctions, etc. ; prohibition of the use of bulls from infected herds for non-infected herds, or *vice versa* ; veterinary certification on movement ; free agglutination tests ; provision of veterinary service for taking blood samples ; veterinary inspection of markets ; the marking of reactors which are to be slaughtered, compensation being paid in certain circumstances ; disinfection ; prohibition against replacement of stock by untested animals and compulsory testing.

II. A summary of the new regulations against contagious abortion which have just come into operation in Norway.—Gustav Naerland (Farsund).

Vidal Munné, J. (1934). Sobre la profilaxis de las Brucelosis. [**Prophylaxis of Brucella Infection**].—*Trab. Inst. Biol. anim. Madr.* **2.** 49-59. 1 table. [61 refs.] [Also appeared in *Rev. Hig. Sanid. pecuar.* **25.** 293-300].

The author discusses the incidence of brucella infection in animals and man in Spain, the conditions in which it occurs and the feasibility of control by the various methods.

He describes the preparation of a peculiar type of vaccine consisting of live bacilli grown in a milk medium, mixed with killed culture and suspended in placental fluid, the whole being carbolized and kept for a month before use until all the organisms were dead.

The results obtained were apparently judged according to the incidence of abortion in the animals inoculated, because abortions had been occurring in the herds. [It is impossible to assess the results obtained].

Panisset, L., & Delbé, P. (1935). Contribution à l'étude de l'action pathogène de *Brucella abortus* pour le cheval. Essai sur la pathogénie de la brucellose équine. [**The Pathogenicity of** *Br. abortus* **for the Horse**].—*Bull. Acad. vét. Fr.* **8.** 119-124. [1 ref.]

The authors injected a mixture of pumice and oil into the scapular space at the top of the withers of a horse and 24 hours afterwards injected a culture of *Br. abortus* intravenously. An inflammatory reaction which disappeared in a month was observed at the withers. Two months after the intravenous injection of *Br. abortus* a weak suspension of that organism was injected intradermally into the skin of the withers. The horse became distressed and there was a marked local reaction, followed in 16 days by abscess formation. A second intradermal injection made two months afterwards produced similar symptoms.

A small quantity of a culture of *Br. abortus* was injected into the scapular space of another horse. Several days later 5 c.c. of an emulsion of *Br. abortus* was injected into the same situation. The injection was followed by local heat and swelling and the animal rapidly lost strength and died. On *post-mortem* examination the lesion resembled one of an early natural case of *Br. abortus* infection.

—F. Blakemore.

McNutt, S. H. (1935). **Incidence and Importance of Brucella Infection of Swine in Packing Houses.**—*J. Amer. vet. med. Ass.* **86.** 183-191. 2 tables. [17 refs.]

McNutt refers to the reports of the occurrence of wide-spread brucella infection in swine in the United States and to the possibility of packing-house employees contracting infection. Following an outline of difficulties, associated with the whole-blood rapid agglutination test, a method of obtaining clear, unobscured reactions is described. A large number of whole-blood, rapid agglutination tests were made in conjunction with cultural examination of material from reacting animals. It is concluded that infection is most apt to become localized in lymphoid tissue of swine although symptoms of illness may not occur, and that infection amongst employees handling diseased material is inevitable.—A. L. M.

Feldman, W. H., Bollman, J. L., & Olson, C., Jr. (1935). **Experimental Brucellosis in Dogs.**—*J. infect. Dis.* **56.** 321-332. 2 figs., 5 tables. [5 refs.]

This investigation revealed that ten out of 11 dogs possessed sufficient resistance to *Brucella abortus* to prevent the development of clinical symptoms and lesions following intravenous or oral administration of either bovine or porcine strains. Agglutinins were induced in most instances, but much more slowly and less pronounced in those dogs which were infected orally.

There was no discernible difference in pathogenicity for dogs between the bovine and porcine strains used in the experiment.—Gwilym O. Davies.

Beattie, C. P., Smith, J., & Tulloch, W. J. (1935). **Undulant Fever in Scotland.** —*Lancet.* **228.** 1427-1431. 2 figs. [16 refs.]

This is an analysis, with particular reference to the epidemiological and clinical features of the disease, of 97 cases of undulant fever that occurred in Scotland between 1929 and 1934. The following are amongst the chief points made in the paper. Fourteen affected persons were in contact with animals or meat. Many of the others were heavy milk drinkers, 18 drinking one pint or more per day. Eight of these were on milk diet for medical reasons. The disease was most common in young adults, chiefly males. The mortality was 4·1 per cent.

All cases showed a titre for *Br. abortus* of 1 : 100 or more, the majority being between 1 : 800 and 1 : 12,800. *Br. abortus* was isolated in culture from the blood in 12 cases and once from the urine, faeces and pancreas.—Gwilym O. Davies.

Zimmermann, E. (1935). Latente Immunisierung gegen den Erreger der Bangschen Krankheit durch Milchgenuss. [**Latent Immunization against *Brucella abortus* through Drinking Milk**].—*Zlb. Bakt. I.* (*Orig.*). **134.** 213-214. [10 refs.]

In Germany the morbidity rate of *Br. abortus* infection in man is 1 : 100,000 as compared with 1 : 20,000 for enteric fever and 1 : 25,000 for paratyphoid fever and for dysentery. People who handle raw milk extensively tend to develop specific agglutinins against *Br. abortus* and an immunity is thus gradually developed. —E. J. Pullinger.

Viridén, P. (1935). Ympningens betydelse som stridsmedel mot sjukdomen smittsam kastning hos nötkreatur. [**The Importance of Vaccination as a Means of Combating Infectious Abortion in Cattle**].—*Skand. VetTidskr.* **25.** 6-26. 6 tables. [2 refs.] [English summary : abst. from orig.]

On February 9th, 1932, all pregnant and non-pregnant cows and heifers, 74 in all, of a brucella-infected herd were inoculated with living *Brucella abortus* culture (the Pitman-Moore strain). Twenty-five of the cows had been vaccinated previously in 1929. The effect was judged partly according to the number of abortions and partly according to agglutination reactions obtained up to two years after the inoculation. A comparison is made between (1) cows with a positive agglutination titre when inoculated. In these cows the abortion percentage was as follows :– the year before inoculation, 25 ; the year after, 12, and the second year, nil [19 cows]. (2) Cows that were not reactors when the inoculation took place. In these cows the corresponding figures were :– nil, 20, nil [five cows]. (3) 15 heifers that had not been covered and displayed no agglutination titre prior to inoculation. They were covered the year after inoculation. 17 per cent. aborted when pregnant with their first calf and none when pregnant with their second calf. Thus the inoculation performed in this manner seems to engender abortion in some cases but, despite the fact that it brings about losses, the relative immunity acquired is still so great that the total losses decrease very considerably. The State Veterinary Bacteriological Institute, Stockholm, therefore considers inoculation with living culture (the Pitman-Moore strain) a good remedy in combating infectious abortion. —H. C. Bendixen (Copenhagen).

Büchli, K. (1933). Uitscheiding van smetstof (Bac. abortus Bang) bij vóór de dekking geïmmuniseerde vaarzen. [**Excretion of Brucella by Heifers Vaccinated before Service**].—*Tijdschr. Diergeneesk.* **60.** 691-712 and 781-791. 4 tables. [English, French and German summaries : abst. from orig.]

No symptoms of illness appeared after prophylactic vaccination with live

cultures, although there was a rise of temperature after the second injection. Soon after vaccination *Br. abortus* could be cultivated from the vaginal mucus of all ten heifers. These bacilli mostly disappeared in six to nine weeks, but in some cases they remained longer. The author succeeded once in cultivating brucella from catheter urine but never found it in the faeces. Heifers should not be served before the third month after vaccination. In nine out of the ten vaccinated heifers, pregnancy resulted after the first service, but one aborted at the seventh month of gestation. The uterus of one heifer contained *Br. abortus* after a normal birth. Although the remaining eight suckled their calves during a period of five to eight months, no infection of the calves resulted. The author concludes that, though *Br. abortus* may be excreted after vaccination, injection of cultures of moderate virulence is effective in the control of infectious abortion in cattle.

—J. VAN DER HOEDEN (UTRECHT).

DUBOIS, C. (1935). Essai de vaccination préventive contre la brucellose ovine. [**Preventive Vaccination against Brucella Infection in Sheep**].—*C. R. Soc. Biol. Paris.* **119.** 1340-1342. [3 refs.]

The author describes a new vaccine against brucella infection of sheep, each dose of which contains two and a half to three thousand million sensitized [method detailed] and avirulent *Br. abortus* of porcine strain thoroughly mixed before use in the following excipient:– 94 per cent. liquid paraffin, 5 per cent. anhydrous lanolin and 1 per cent. powdered lycopodium (club-moss). The vaccine was tested upon ten brucella-free sheep of 18 months of age which were pregnant, with similar sheep as controls, each group being tested three weeks later with one thousand million *Br. melitensis* (isolated from a case of undulant fever a few days previous to use). Among the vaccinated sheep, seven normal parturitions, two abortions and one case of sterility occurred, while among the controls there were two normal parturitions, seven abortions and one case of sterility. One of the latter abortors died from puerperal septicaemia. The vaccine is now being tested against natural brucella infection in sheep.—C. V. WATKINS.

OKOUNSOFF, I. V. (1935). **Antiserum against Contagious Equine Abortion.** *Sovyet. Vet.* No. 2. pp. 18-23. 1 table. [Abst. from French summary].

This is a report on work carried out by the author with a specific contagious equine abortion antiserum prepared by him. It proved innocuous, sterile and safe in use, did not give rise to anaphylactic shock nor bring about abortion of in-foal mares. Experiments with in-foal mares indicate that it possesses excellent prophylactic and therapeutic properties.—C. DAVENPORT.

SERRA, A. (1934). La coltura sui terreni all'uovo come mezzo differenziale delle "Brucelle". [**Differentiation of Brucella by Egg Media**].—*Nuovo Ercol.* **39.** 397-406. 1 table. [14 refs.]

This article deals with the cultivation of various types of brucella grown upon special egg media. The author stresses the importance of work of this nature and reviews the methods adopted by HUDDLESON, by DE SANTIS and other workers.

The authors quoted have found that, in the majority of cases examined, *Br. melitensis* and *Br. paramelitensis* develop rapidly on Petragnani's egg medium, the colour of the growth varying from light yellow to dark green, whilst the development of *Br. abortus* is completely inhibited. The growth obtained with Petroff's medium was not useful for purposes of differentiation.

The Petragnani method proved to be the simplest and best means of

differentiating the various types of brucella organisms. The method proposed by DE SANTIS may be considered useful for diagnosis together with other differential cultural methods in common use (Huddleson's method).

The writer cultivated 73 strains of brucella, using the egg medium of Petragnani and Petroff; he showed that *Br. melitensis* develops vigorously on this medium after two or three days' cultivation, frequently producing a characteristic green coloration, whilst as a rule *Br. abortus* does not develop. It is maintained that cultivation by the Petragnani method may serve to differentiate between *Br. abortus* and *Br. melitensis*.—K. D. DOWNHAM.

KALMBACH, E. R. (1935). **Will Botulism Become a World-Wide Hazard to Wild Fowl?**—*J. Amer. vet. med. Ass.* **87.** 183-187. 2 figs. [8 refs.]

The opinion is expressed that outbreaks of botulism (*Clostridium botulinum* Type C) in wild fowl have become more frequent during the past two decades. A map of North America is given showing points at which authentic outbreaks have occurred between 1910 and 1934. These number 52.—R. S. ROBERTS.

ROSE, A. L. (1934). **Enzootic Botulism amongst Wild Birds.**—*Aust. vet. J.* **10.** 175-177. [1 ref.]

The publication of PULLAR's article [this *Bull.* **5.** 614.] describing an outbreak of enzootic botulism in birds in Victoria, led the author to record these observations on a disease in New South Wales which was clinically similar. The seasonal and other conditions under which the New South Wales losses occurred also led the author to consider that the outbreaks in the two states were due to the same disease. In two of the outbreaks, the disease appeared to be introduced by the offal of wild ducks and then spread among the farm poultry.—W. I. B. BEVERIDGE.

DE BLIECK, L., & JANSEN, J. (1935). Een vergelijkend onderzoek van boutvuurfiltraten en boutvuurformolvaccins. [**A Comparative Examination of Anti-Blackleg Filtrates and Formol Vaccines**].—*Tijdschr. Diergeneesk.* **62.** 117-127. 3 tables. [21 refs.] [English, French and German summaries: abst. from orig.]

Using guinea pigs, a comparative investigation was carried out on the immunizing capacity of culture filtrates and formol vaccine against *Clostridium chauvoei*. After injection of a filtrate passed through a Berkefeld candle, guinea pigs seemed to be immune against blackleg infection. Nevertheless, one of the guinea pigs contracted the disease after injection of the filtrate, which was probably due to spores which had passed through the filter. Cultures first passed through a Berkefeld candle and afterwards through a Chamberland candle did not always possess an effective immunizing power. A commercial filtrate of *Cl. chauvoei* and *Cl. oedematiens* showed no immunizing properties at all. On the other hand, very good results were obtained by using cultures of *Cl. chauvoei* which were destroyed by 0·5 to 1 per cent. formol. All of the 24 vaccinated guinea pigs remained in good health after infection, while 16 of the 19 controls died from blackleg. The administration of formol vaccine is advised as being the best prophylactic procedure at the present time. [Compare paper by LOURENS, below].

—J. VAN DER HOEDEN (UTRECHT).

LOURENS, L. F. D. E. (1935). Boutvuurfiltraat-boutvuurformolvaccin. [**Blackleg Filtrate and Formol Vaccine**].—*Tijdschr. Diergeneesk.* **62.** 408-414. [English, French and German summaries: abst. from orig.]

The use of filtrates or formol vaccines in blackleg prophylaxis is compared

according to the experience gathered from the State Serum Institute in Rotterdam. As the immunity against this disease is probably due to an antitoxin, a toxin should be used for immunization and not a culture.

The old methods also depended upon the injection of toxins (filtrates of desiccated muscle juice from patients or broth cultures) or upon causing a focal infection which produces the toxins. The results obtained with filtrates have been so successful in practice that there is no reason to supercede the filtrates by formol vaccine.—J. VAN DER HOEDEN (UTRECHT).

COLEF, L. (1935). Dissociation du *Bacillus oedematiens*. [**The Dissociation of *Clostridium oedematiens***].—*C. R. Soc. Biol. Paris.* **119.** 684-685.

Of 16 strains of *Cl. oedematiens* studied, four have shown temporary variation and two fixed variation. The fixed variants keep their distinctive features for a long time, particularly if kept in a refrigerator. They are non-toxic and non-pathogenic but retain their agglutinating properties.—GWILYM O. DAVIES.

WEINBERG, M., & GILLAUMIE, M. (1935). Préparation de sérum anti-vibrion septique par le procédé d'enrobement de l'antigène dans la lanoline. [**Preparation of Antiserum against *Clostridium septique* with Lanolinized Antigen**].—*C. R. Soc. Biol. Paris.* **119.** 719-721. [11 refs.]

The authors are able to support RAMON's previously published views on the efficacy of lanolin when mixed with antigen in the production of immunity. They give details of the strongly antitoxic and antihaemolytic serum obtained from a horse by injecting *Cl. septique* and its toxin enveloped in lanolin. They say that by the classical methods they have never obtained such a high-titred serum so quickly with comparatively weak antigen.—GWILYM O. DAVIES.

TUTTLE, W. M., & CANNON, P. R. (1935). **The Passage of Bacteria from the Lungs into the Blood Stream.**—*J. infect. Dis.* **56.** 31-37. 1 table. [8 refs.]

Fourteen healthy dogs were narcotized with phenobarbital. The thoracic duct, at its point of entrance into the subclavian vein, and the left femoral vessels were exposed so that samples of blood and lymph were obtainable. 10 c.c. of suspension of *Chromobact. prodigiosum*, *Staphylococcus aureus* and *Streptococcus haemolyticus*, in 0·8 per cent. saline, were inoculated into the left lower pulmonary lobe by a sterile catheter, introduced through a bronchoscope. Cultures were made from the blood and lymph, drawn every five minutes or more, for the first hour after inoculation. At the end of the hour, the animal was killed and pieces of lung and the tracheobronchial lymph glands were fixed and sectioned. Numerous colonies were generally obtained in the blood cultures, but much less often in the lymph cultures, from the dogs inoculated with *Str. haemolyticus*, and no growth was obtained in either the blood or lymph cultures from those inoculated with *Chromobact. prodigiosum* or with *Staph. aureus*. In sections of the lungs inoculated with *Chromobact. prodigiosum* and *Staph. aureus*, large numbers of bacteria were present in the alveoli, both extracellular and within the septal cells. The lymph glands were essentially normal. The microscopic picture of the lung inoculated with *Str. haemolyticus* was one of greater oedema and engorgement with blood. The bacteria had penetrated deeper and were fewer in the alveoli, and were not so much ingested by the alveolar septal cells. The lymph glands were again essentially normal.—A. BROWNLEE.

LINDAU, A. (1933). **Some Investigations Concerning the Resorption of Bacteria from the Digestive Canal.**—*Acta path. microbiol. scand.* Suppl. 16. pp. 225-230. [13 refs.] [In English].

Behring, Ehrlich, Romer and others have demonstrated that proteins, antitoxins, etc., pass from the gastro-intestinal canal unchanged into the blood of new-born animals ; this is not so in the case of adults. It is not possible to draw direct conclusions from these tests in respect of bacteria. Calmette, discussing the oral administration of BCG to young animals, stated that there takes place a universal impregnation of the entire lymphatic system – every dose given by ingestion being followed by a complete dissemination of BCG into the blood stream. Autopsies made in connection with the Lübeck tragedy do not support this view.

The author fed India ink, carmine dye and crimson lake to white mice for ten to 20 days and killed them three hours after the last meal. Sections showed only a few solitary red granules but no India ink granules in the lymph follicles of the intestinal walls.

*Mycobact. phlei* was fed to white mice which were killed after 3, 6 or 20 hours but no mycobacteria were discovered in the intestinal wall. Guinea pigs were fed with 10 cg. of highly virulent *M. tuberculosis* (bovine strain) in milk and killed 3, 8, 24 and 48 hours and four to seven days later. Examination of 500 sections showed positive findings in lymph follicles in only a few cases. Animals killed after two to seven days showed obviously larger plaques and lymph nodes than those killed at the earlier stages. Fourteen-day-old guinea pigs were given three doses each consisting of 15 mg. BCG and killed after 3, 5 and 24 hours and three and eight days. Only a few bacteria were noted in the tissues.

The experiments are taken as showing that the resorption of corpuscular elements, apathogenic acid-fast bacteria, BCG and virulent *M. tuberculosis* occurs to a very small extent only. The results are not in keeping with Calmette's assumption that general impregnation of the lymphatic system takes place.

—H. E. Bywater.

de Magalhaes, O. (1935). Ensaios de Mycologia. **[Mycological Notes].**—*Mem. Inst. Osw. Cruz.* **30.** 1-55. 217 figs. on 48 plates. [Numerous refs.]

In the first part of this comprehensive review the author gives a list of cases of infection with fungi reported in Minas Geraes during the last three years, *Microsporon felineum* being of veterinary interest.

In the second part a résumé is given of the discovery of various fungi by different workers during the past hundred years. The author points out that some of these have been proved to be identical and gives the present nomenclature for the organisms. He includes a 28-page list of these fungi, with the names of the workers who discovered them and gives the references in the literature reporting their discovery, in chronological order. The following are reported as occurring in animals.

In Horses.—*Microsporon equineum* ( = *Trichophyton minimum*), *T. equineum*, *T. verrucosum* ( = *T. ochraceum* Sabouraud), *T. granulosum*, *Achorium annulosum*, *A. serisei.*

In Dogs.—*M. lanosum*, *T. caninum.*

In Canaries.—*M. radiatum.*

In Mice.—*A. quinckeanum.*

In Sheep.—*T. pruinosum.*

Unspecified.—*T. mentagraphytes* var. *persicolor.*

The third part of the review contains detailed descriptions of two new fungi which can be added to the list. One is of veterinary interest and has been named *T. gamelleirae* n.sp. seen in cattle imported from the United States of America. It has been proved pathogenic for cattle, human beings and " porcos da India ".

The lesions could be reproduced by inoculation into guinea pigs, rabbits and a human volunteer. Microscopic examination of cultures showed it to belong to the genus *Trichophyton*.

The plates and carefully made diagrams help to make this review a most useful contribution to the literature on fungi.

THOMPSON, L. (1935). Weitere Studien über Actinobacillus. [**Further Studies on the Actinobacillus**].—*Zlb. Bakt. I.* (*Orig.*). **134.** 192-194. 2 tables. [5 refs.]

A serological study has been made of nine strains of *Actinobacillus lignieresi*, seven of *Pfeifferella mallei* and two of *Pf. whitmori*. Cross-agglutination tests were made with antisera prepared against three strains of actinobacillus, four of *Pf. mallei* and two of *Pf. whitmori*.

One of the strains of *Pf. whitmori* was practically inagglutinable, except in its homologous serum. Apart from this strain, cross-agglutination at reduced titres took place between the actinobacillus and pfeifferella strains and sera. There was no agglutination of strains of brucella, pasteurella, corynebacteria and pseudomonas which were tested as controls. No agglutinin absorption tests are recorded.

From these results it is concluded that there is a considerable antigenic similarity between the actinobacillus and pfeifferella, and that these organisms should all be grouped in a common genus *Actinobacillus*. [It is not clear whether the strains tested were in the " smooth " phase].—E. J. PULLINGER.

CATANEI, A. (1935). La résistance aux réinfections dans les teignes (étude expérimentale). [**Resistance to Reinfection with Ringworm**].—*Arch. Inst. Pasteur Algér.* **13.** 219-232. 2 figs. on 1 plate, 2 tables, 1 graph. [1 ref.]

Experiments conducted to determine the nature of the resistance of certain animals to reinfection with ringworm were carried out with *Trichophyton asteroides* Sabouraud, 1909, (*Ctenomyces mentagrophytes* in Langeron and Milochevitch's classification).

The author's results show that, when reinoculated within 15 months of a previous infection, only a small proportion of guinea pigs become reinfected. Resistance to a second infection is associated with a skin reaction which develops at the site of inoculation. The reaction is allergic in type and is likened by the author to von Pirquet's reaction. The same reaction can be obtained with culture filtrates or killed cultures of the parasite when applied to the skin or injected intradermally. It is an indication of the degree of immunity possessed by the animal. It varies in different animals and for different parasites and sometimes for the same parasite according to the lesion which it produces.—GWILYM O. DAVIES.

## DISEASES CAUSED BY PROTOZOAN PARASITES.

SIMIĆ, T. (1935). Infection expérimentale de l'homme et du chien par l'*Entamoeba hartmanni* Prowazek 1912. [**Experimental Infection of Man and the Dog with *E. hartmanni* Prowazek 1912**].—*Ann. Parasit. hum. comp.* **13.** 234-237. [6 refs.]

This article records the infection of a human volunteer with *E. hartmanni*, and attempts to infect dogs and cats by the ingestion of his faeces. The attempts to infect cats were unsuccessful, but two dogs out of six were successfully infected after a primary infestation with *Trichomonas intestinalis*. The entamoeba did not appear to be pathogenic for dogs.—U. F. RICHARDSON.

Nattan-Larrier, L., & Grimard, L. (1935). Les chiens de luxe contaminés dans le midi de la France peuvent-ils répandre la leishmaniose en dehors des foyers de la maladie ? [**Can Pet Dogs Carry Leishmaniasis Beyond the Usual Boundaries of the Disease ?**].—*Bull. Soc. Path. exot.* **28.** 270-277. [4 refs.]

This article discusses the danger that dogs taken to the south coast of France for the summer may contract leishmaniasis and, on returning to their home country, may prove sources of infection for children. It is probable that cases of canine leishmaniasis do occur amongst pet dogs taken on holiday to the south coast and that these cases are not recognized, as symptoms develop on their return to areas in which the disease is not suspected. Nine cases of suspected leishmaniasis, in which the formol-gel, neostibamine and complement-fixation tests were positive, are recorded in Paris. Though the distribution of *Phlebotomus perniciosus*, the insect blamed for transmission, is not fully known, it certainly occurs outside the areas in which leishmaniasis is endemic. The authors do not consider, however, that insect transmission is a real danger to children, but suggest that direct transmission from infected sores, saliva and tears may occur, and that owners taking dogs to the south of France should be warned of the danger and advised that, if suspicious symptoms appear, they should seek veterinary advice, and have infected dogs either treated or destroyed.—U. F. Richardson.

Stewart, J. (1935). **Predilection of Specific Trypanosomes for Certain Animals.** —*Vet. J.* **91.** 218-219.

This note records that in the Gold Coast, on exposure in a four acre tsetse-infested plantation to the attacks of *Glossina tachinoides*, cattle developed infections with *Tryp. congolense*, *T. vivax* and *T. brucei*, but pigs in the same area developed *T. brucei* infection only. Pupae of *G. tachinoides* were diligently searched for and were only found within 25 feet of a water hole in the plantation, though the shade conditions and ground humidity were identical throughout.—U. F. Richardson.

Tseng, H. (1935). Ueber die gegenseitige Beeinflussung verschiedener Trypanosomen bei Mischinfektion. [**The Influence of Trypanosome Species on each other in Mixed Infections**].—*Zlb. Bakt. I.* (*Orig.*). **134.** 153-159. 6 tables. [6 refs.]

Mixed infections of *Tryp. gambiense*, *T. lewisi* and *T. cruzi* in rats showed no departure from the normal course of pure infections up to death, which was due to *T. cruzi*. *T. brucei* in rats and mice had an inhibitory effect on the development of a *T. congolense* infection. If the two species were inoculated simultaneously, *T. congolense* failed to develop, whilst if *T. congolense* was inoculated first, a consequent *T. brucei* inoculation prevented any further increase in numbers of *T. congolense*. The author considers that a species of trypanosome will influence a closely related species in mixed infections, but widely separated species fail to exert any influence on each other.—U. F. Richardson.

Schilling, C., Schreck, H., Neumann, H., & Kunert, H. (1934). Versuche zur Schutzimpfung gegen Tsetsekrankheit. [**Research on Protective Inoculation against Trypanosomiasis**].—*Z. ImmunForsch.* **83.** 71-94. 5 charts, 1 map. [6 refs.]

This article contains further information [see this *Bull.* **5.** 18.] on the experimental immunization of young horses and cattle in Germany against exposure to trypanosomiasis carried by tsetse flies which were imported from Tanganyika

Territory, and were infected with *Tryp. brucei* and *T. congolense*. The authors emphasize the importance of infecting the experimental animals at an early age, and suggest that the immunity derived from an infected mother may not be so essential as was thought in the earlier work, when attempts were made to confer a similar preliminary immunity by the means of vaccines. Further encouraging results were obtained by the method of producing a mild chronic infection in young animals by the inoculation of small quantities of blood from an animal with a chronic infection, and one case of the production of a mild chronic infection in a three-year-old ox is recorded. Animals which appeared to have made a complete recovery could be reinfected, but these reinfections were of a fleeting nature, homologous strains producing no animal reaction, and heterologous strains producing mild febrile reactions sometimes accompanied with loss of weight. —U. F. Richardson.

Velu, H., & Zottner, G. (1935). Chimioprévention et chimiothérapie de la dourine sous contrôle sérologique (déviation du complément). [**Chemical Protection against Dourine and the Treatment of Dourine Controlled by Complement-Fixation**].—*Maroc méd.* March 15th. 100-101. [2 refs.]

" Naganol " in doses of 0·0035 g. per kg. body weight, given subcutaneously every ten days to three horses, protected them against virulent blood containing *Trypanosoma equiperdum* repeatedly applied to the nasal mucous membrane. Small repeated doses of " naganol " produced apparent cure in three horses, but the complement-fixation test remained positive and the horses relapsed. One horse treated by Ciuca's method (0·04 g. of novarsenobenzol per kg. body weight on two consecutive days) made an apparent recovery, but was also positive to the complement-fixation test, and only made a true recovery after a second course of treatment. The authors consider that control of dourine can be assured by the testing of breeding stock by complement-fixation, by the preventive use of " naganol ", and by the treatment of affected animals by Ciuca's method.—U. F. R.

Alongi, G., & Balboni, A. (1935). La tripanosomiasi del dromedario in Tripolitania. [**Trypanosomiasis of Dromedaries in Tripoli**].—*Clin. vet., Milano.* **58.** 110-131. 3 figs.

The disease of dromedaries known as " slima " in Tripoli is caused by *Tryp. soudanense* and is prevalent from May to September. In acute cases, there is depression, anorexia, a rise in temperature and death in 24 to 48 hours. In chronic cases there is lacrymation, irregular rumination, progressive emaciation and intermittent fever. The symptoms last from one to several months. *Post-mortem* examination reveals an enlarged spleen, fatty degeneration of the liver, glomerular nephritis and occasionally lobular pneumonia. The parasites which may be seen in the peripheral circulation cause clumping of the red blood corpuscles.

Transmission experiments show that the vectors are species of Tabanidae and *Stomoxys*. Camels, horses, rabbits, guinea pigs, dogs and rats are very susceptible to the disease whilst mules, cats and jackals are less so and goats are resistant. Only a benign form has been seen in cattle and sheep.

The intravenous injection of 8 to 10 c.c. of " naganol " is the only treatment likely to produce beneficial results. Prophylactic measures are of little avail since camels suffering from the chronic form of the disease are not easy to detect and form a reservoir for the parasites. When animals are first introduced into a danger area, 4 to 5 c.c. of " naganol " renders them less liable to an attack for about four months.—J. A. Nicholson.

VAN DEN BRANDEN, F. (1935). Sur le rapport du poids de la rate ou du foie au poids du corps, chez des rats blancs (variété albinos de *Mus decumanus*) non infectés, ainsi que chez les animaux de même espèce, préalablement infectés de *Trypanosoma congolense* ou de *Trypanosoma brucei*, puis guéris ou non guéris par traitement. [**The Relationship between Body Weight and the Weight of the Liver and Spleen in Normal White Rats, and Rats infected with** *Tryp. congolense* **or** *brucei*].—*C. R. Soc. Biol. Paris.* **119.** 529-530. [1 ref.]

The author found that in rats infected with *T. congolense* or *T. brucei* the liver was not affected, whilst the spleen was enlarged, the increased size being mainly due to hypertrophy of the reticulo-endothelial tissue. On successful treatment of the trypanosome infections with antimonials the size of the spleen returned to normal.—U. F. RICHARDSON.

BEVAN, L. E. W. (1935). **Notes on the Human Trypanosomiasis of Southern Rhodesia.**—*J. comp. Path.* **48.** 97-111. 3 tables. [20 refs.]

This article sketches the history of sleeping sickness in Southern Rhodesia and discusses the evidence as to the relationship between *Tryp. rhodesiense, T. brucei* and *T. gambiense.* The author concludes that the question has not yet been answered as to whether *T. rhodesiense* is *T. brucei* in man, or whether it is *T. gambiense* transmitted by *Glossina morsitans*, or whether it is a species *sui generis.* The trypanosome is undoubtedly transmitted by *G. morsitans*, and it would appear that the transference is man-fly-man rather than animal-fly-man. The theory is advanced that, with the disappearance of tsetse fly after the rinderpest epizootic of 1896, except for residual areas of tsetse infestation, man lost his infection with trypanosomes and also his immunity. Recently it has appeared that human carriers of trypanosomes are confined to those areas where tsetse fly persisted after the rinderpest epizootic, and where local natives would be liable to infection from birth, and premunity would be maintained by repeated reinfection. With the clearing up of these comparatively limited areas it seems probable that the undesirable menace of sleeping sickness will be entirely eliminated from Southern Rhodesia.—U. F. RICHARDSON.

DIAS, E. (1934). Trypanosoma cruzi ou Schizotrypanum cruzi ? [*Tryp. cruzi* **or** *Schizotrypanum cruzi ?*]—*Mem. Inst. Osw. Cruz.* **29.** 203-227. 1 table. [42 refs.] [French summary : abst. from orig.]

The author suggests that the generic name *Schizotrypanum* should be retained, as, although the claim to multiplication by schizogony has been abandoned, the intracellular division of leishmanial forms is the normal method of multiplication of *T. cruzi* and distinguishes it from the genus *Trypanosoma*, in which multiplication is attained by the division of the blood parasites.—U. F. RICHARDSON.

CAMERON, H. S. (1935). **Bovine Trichomoniasis.**—*Cornell Vet.* **25.** 99-110. [13 refs.]

This article gives an excellent summary of the findings of workers who have recently been studying genital trichomoniasis of cattle, and records that, in examining 39 aborted foetuses from herds which were free from brucella infection, five exhibited trichomonad infection. This condition has now been observed in several states scattered between the east and west coasts of the United States of America, and has been diagnosed in three herds in New York State. For diagnosis, the author recommends the examination of fresh moist smears under a 16 mm. objective. If no organisms are detected, the sample should be diluted with a

sterile solution of Löffler's dehydrated blood serum in normal saline and incubated overnight.—U. F. Richardson.

Lwoff, A., & Nicolau, S. (1935). Le pouvoir pathogène de *Trichomonas foetus* pour le système nerveux central. [**The Pathogenicity of** *Trichomonas foetus* **for the Central Nervous System**].—*Bull. Soc. Path. exot.* **28.** 277-281. [10 refs.]

This article records the infection of white rats and mice with the genital trichomonad of cattle by intraperitoneal inoculation of pure cultures, and the infection of the central nervous system in rabbits, rats, dogs and monkeys by subdural inoculation. The strain used, after 202 passages *in vitro*, killed a rabbit in 21 days after the first subdural inoculation, but the pathogenicity was increased by passage, and at the fourth passage death occurred on the third day. The lesions of the central nervous system varied with the acuteness of the disease, the parasites being most numerous in the lateral ventricles.—U. F. Richardson.

Yakimoff, & Gousseff. (1935). Coccidiose des cobayes en Russie. [**Coccidiosis of Guinea Pigs in Russia**].—*Bull. Soc. Path. exot.* **28.** 434-435. 1 table.

The authors report the identification of *Eimeria caviae* oocysts in the faeces of guinea pigs in Russia.—R. S. Roberts.

Brumpt, E. (1935). Paludisme aviaire : Plasmodium gallinaceum n.sp. de la poule domestique. [**Avian Malaria :** *Plasmodium gallinaceum* **n.sp. from the Domestic Fowl**].—*C. R. Acad. Sci. Paris.* **200.** 783-785.

This note describes a malarial parasite of fowls as seen in blood smears from Nhatrang, Indo-China. The parasite was discovered in 1910 by Broussais who succeeded in transmitting the infection to other fowls by subinoculation. In spite of intensive investigations no further outbreaks have been detected, but it is noted that Crawford recorded a fatal disease of fowls in Ceylon in 1933 due to *P. relictum*.

In the smears available from the Nhatrang cases, the merozoites vary in number between eight and 30, and the sexual forms are distinguished from the schizonts by the blue colour of the female and the rose-red of the male. Attempts to infect fowls with the malarial parasites of passerine birds have all failed, and the author considers that this fowl parasite must be considered a distinct species.—U. F. R.

Giovannola, A. (1934). Tentativo di classificazione dei plasmodi aviari. [**Classification of the Avian Plasmodia**].—*Riv. Malariol.* **13.** 372-379. 24 figs. on 1 plate, 1 table. [8 refs.] [English summary]. [Abst. from abst. in *Trop. Dis. Bull.* **32.** 122].

The author of the paper under review tabulates the known species under three headings :- (1) forms which have spherical gametocytes and cause displacement of the nucleus of the host cell ; (2) forms which have elongate gametocytes and displace the nucleus, and (3) forms with elongate gametocytes and no nuclear displacement. To the first group belong *P. praecox*, *P. cathemerium*, *P. capistrani* and *P. wasielewski* ; to the second *P. elongatum* ; to the third *P. rouxi*, *P. tenue*, *P. circumflexum* and *P. fallax*. The paper gives the differential diagnosis of these species and a plate illustrating the various types.—J. E.

Rossi, P. (1935). Urée sanguine et piroplasmose équine vrai (*Piroplasma caballi*). [**Blood Urea in True Equine Piroplasmosis** (*Babesia caballi* **Infection**)].—*C. R. Soc. Biol. Paris.* **119.** 847-849.

The author draws attention to the increase of blood urea which occurs in

*B. caballi* infection. From a normal of 0·35 to 0·4 g., the blood content recorded in 13 cases of equine piroplasmosis varied between 0·484 and 2·2033 g. This uraemia persists for some time after recovery and is not reduced by treatment, although a sharp drop is recorded in one case after treatment with " gonacrine ". The author suggests that the condition is due to excess production by the liver combined with a failure in elimination by the kidneys.—U. F. Richardson.

Garcia, I. (1934). Una piroplasmosis más en España : la falsa fiebre de la costa. [**Another Piroplasmosis in Spain : False East Coast Fever**].—*Trab. Inst. Biol. anim. Madr.* **2.** 107-120. 2 figs., 2 tables. [14 refs.]

The disease referred to was characterized by progressive emaciation and anaemia, the red blood cell count being 700,000 in the most severe case examined. The precrural glands were enlarged, the milk yield was diminished and the appetite was in abeyance. The urine remained normal and recovery was spontaneous. Parasites observed in the blood could be classified as *Theileria* ; their scarcity and morphology and the benign nature of the outbreak suggested *Th. mutans.*

Only one outbreak is reported and, as this was in a small herd which had been moved a month previously from another district, the author concludes that the disease was a lighting up of a latent infection.—R. S. Roberts.

Gilbert, S. J. (1935). **Experiments on the Value of Protective Inoculation against Theileria annulata of Cattle.**—*J. comp. Path.* **48.** 112-116. 1 table. [4 refs.]

This article records attempts to protect 11 calves by inoculation with blood from a heifer which was carrying a *Th. annulata* infection, and possibly also anaplasmosis, spirochaetosis and *Babesia bigemina*, *B. bovis*, and *Tryp. theileri* infections. On subinoculation, theileria and anaplasma always appeared, but the other organisms have not been seen since local calves were used for inoculation experiments in place of imported animals. All but three of the 11 animals under experiment died, either failing to recover condition after the inoculation or on exposure to tick infestation. The author concludes that the limited number of experiments carried out do not indicate that premunition is likely to be a useful method of protecting cattle against theileriasis as it exists in Palestine.—U. F. R.

Garcia, I. (1934). Identificación con la anaplasmosis de una enzootia estabular. [**An Enzootic Disease in a Herd of Cattle Diagnosed as Anaplasmosis**].—*Trab. Inst. Biol. anim. Madr.* **2.** 88-106. 6 figs., 4 tables, 2 graphs. [16 refs.] [Also appears in *Rev. Hig. Sanid. pecuar.* **25.** 300-312].

An outbreak of anaplasmosis in a herd of 17 bovines is reported. Twelve animals became affected, cases appearing at intervals of approximately one month and lasting from ten to 80 days ; all the animals survived. Blood from natural cases was inoculated into two bovines. Blood smears from the natural and experimental cases showed parasites of the anaplasma type in about 40 per cent. of the red blood corpuscles. The blood picture in several animals is described in detail. The author suggests that the disease may differ slightly from anaplasmosis in other countries. He bases his opinion on the greater diameter of the parasite which he observed (0·5 to 1·2$\mu$) and the benign nature of the outbreak. An appendix deals with the possible vectors in Spain.—R. S. Roberts.

Glaser, R. W., & Coria, N. A. (1935). **The Partial Purification of *Balantidium coli* from Swine.**—*J. Parasit.* **21.** 190-193. [8 refs.]

This article records attempts to obtain pure cultures of *Balantidium coli*, in view of the inimical action of bacteria on the maintenance of the protozoa in culture. On inoculating one arm of V tubes containing a semi-solid medium, composed of Ringer's solution, nutrient agar, rice starch and fresh horse serum, it was found that the protozoa migrated to the bottom of the tube within 24 to 48 hours, whilst the bacteria did not sink so rapidly. For subinoculation, material from the bottom of the tube was withdrawn by the other arm of the V. In this way, cultures of balantidium were obtained which could safely be held in the semi-solid gel for seven days without transplantation, although all efforts to eliminate bacteria completely proved unsuccessful; some contamination with species of *Bact. coli* always remained.—U. F. Richardson.

Carpano, M. (1935). Sur un nouveau microparasite du type *Grahamella-Rickettsia*, observé chez les poulets (*Grahamella gallinarum*). [**A New Parasite of the Fowl,** *G. gallinarum*].—*Ann. Parasit. hum. comp.* **13.** 238-242. 6 figs. on 1 plate.

The author describes two micro-organisms found in a Leghorn cock which was brought for diagnosis to the laboratory in Cairo by a European rearer.

One was a pleomorphic parasite of the grahamella-rickettsia type which was found in the erythrocytes, leucocytes and endothelial cells, and the other a Gram-negative organism related to the coli-typhoid group. Numerous *Argas persicus* were found on the bird.

The presence of these two apparently distinct organisms raises the question of their relationship and significance, this being the first case in which a parasite of the grahamella-rickettsia group has been recorded in fowls. Provisionally it has been named *Grahamella gallinarum*.—Gwilym O. Davies.

Wertheim, P. (1935). **A New Ciliate,** *Entodinium bovis* **n.sp., from the Stomach of** *Bos taurus* **L., with the Revision of** *Entodinium exiguum*, *E. nanellum*, *E. simplex*, *E. dubardi dubardi* **and** *E. parvum*.—*Parasitology*. **27.** 226-230. 6 figs., 1 table. [7 refs.]

The author describes a ciliate collected from the rumen and reticulum of cattle in Yugoslavia. The species is characterized by being more spherical than other known species of *Entodinium*. It is claimed that the various species of *Entodinium* can be differentiated by variations in the shape of the body, the shape of the macronucleus, the position of the anus and the character of the ectoplasm. —U. F. Richardson.

Morcos, Z. (1935). **Preliminary Studies in Fowl Spirochaetosis in Egypt.**—*Vet. J.* **91.** 161-171. 1 table. [28 refs.]

More than half of this article is given to a review of the literature on avian spirochaetosis, and the principal findings of authors quoted are detailed.

The blood of five affected birds was examined, but no spirochaetes could be demonstrated. Irregular round or oval pink-staining bodies were found in the red blood corpuscles, and after feeding on a very poor diet spirochaetes were observed. Good results followed the intramuscular injection of "atoxyl" and piro blue, and these drugs were also found to be of value in cases of avian piroplasmosis. The author states that Balfour bodies are identical with *Aegyptianella pullorum*. Egyptian-bred fowls and pigeons were found to be resistant to spirochaetosis, and formalized spleen and liver emulsion obtained from affected birds appeared to give promising results as a protective agent.—J. E. Wilson.

Hegner, R. (1935). **Protozoa from Other Animals in the Ceca of Parasite-Free Chicks.**—*J. Parasit.* **21.** 59-60.

The infection of chickens with trichomonads from owls and chimpanzees is recorded. Infection was not obtained with *Chilomastix* from chimpanzees nor with ciliates and trichomonads from the stomachs of ruminants, nor with various protozoa from the intestines of cockroaches.—U. F. Richardson.

## DISEASES CAUSED BY VIRUSES.

Merling-Eisenberg, K. B. (1935). **Observations on the Life-Cycle of the Pleuro-Pneumonia Virus.**—*Brit. J. exp. Path.* **16.** 411-416. 1 text fig., 25 figs. on 2 plates. [8 refs.]

The micro-organism of contagious bovine pleuro-pneumonia was studied in the form of surface colonies on serum agar by means of the Ultropak and also by means of dark ground illumination. Continuous observations were made over periods as long as 21 days.

The author claims that the life-cycle of the organism consists of the following stages. (1) Elementary bodies which appear as diffraction discs with no sharp contour. They are approximately 0·1$\mu$ in diameter and are sometimes in chain formation. (2) These bodies develop into elementary discs of various sizes. (3) Elementary bodies appear on the periphery of the discs. (4) The disc forms a sphere with an internal structure containing elementary bodies. This stage represents a complete virus colony. (5) The spheres break up and release the elementary bodies. Certain other forms met with are referred to as involution forms.

Photomicrographs of most of the forms and a diagrammatic representation of the life-cycle of the organism are included in the paper.—Gwilym O. Davies.

Daubney, R. (1935). **Contagious Bovine Pleuro-Pneumonia. Note on Experimental Reproduction and Infection by Contact.**—*J. comp. Path.* **48.** 83-96. 2 figs., 2 tables, 4 graphs. [2 refs.]

In view of the general failure to reproduce pleuro-pneumonia in susceptible cattle by the inoculation of cultures or by contact under experimental conditions, further attempts were made to induce the disease artificially. In the first series, filtered virulent thoracic lymph was injected intratracheally into seven animals, but only one showed clear-cut lesions at autopsy. Better results were obtained by the intrajugular inoculation of lymph or cultures incorporated in emboli of 2 to 3 per cent. agar, as five positive cases out of nine were recorded. It is suggested that this method may prove of considerable value in future investigations.

In preliminary experiments, no animal which was placed in contact with artificially infected cattle contracted the disease. On the other hand, transmission was secured by placing 12 cattle (in two batches) in contact with clinical cases of the disease : four showed typical lesions on *post-mortem* examination. In two of these, incubation periods of 27 and 30 days respectively, after all contact had ceased, were recorded. The results of the application of various serological tests for the detection of carriers amongst animals exposed to infection were disappointing.—R. E. Glover.

Cèbe, J., & Perrin, J. (1934). Résultats obtenus par la vaccination antipestique dans un foyer naturel de peste bovine sévissant dans la province de Ha-Dong. **[Anti-Rinderpest Vaccination in the Province of Ha-Dong, Indo-China].**—*Bull. écon. Indochine.* **37.** 703-716. 10 tables.

This paper records the use of vaccine alone and serum-vaccine inoculation to protect buffaloes against rinderpest in three villages in an infected area in Indo-China. In one village the mortality had previously been 83·33 per cent., but double inoculation of 30 animals with vaccine and serum saved all but two animals ; the mortality in unvaccinated controls was 33·3 per cent. In the other two villages vaccine alone was used with apparently successful results but, as the mortality in the controls was also negligible, the value of the vaccine cannot be assessed. [No information is given as to the type of vaccine used].—U. F. Richardson.

Joshy, R. R. (1935). **Active Immunisation of Cattle against Rinderpest with special reference to Goat Virus Alone Vaccination in H. E. H. the Nizam's Dominions.**—*Indian vet. J.* **11.** 256-258. 7 figs. on 2 plates.

The active immunization of cattle against rinderpest in Hyderabad was commenced in 1929, when it was found that the dose of serum recommended by the Muktesar laboratory for double inoculation was too high for the local cattle and led to " blocked out " reactions with subsequent breakdown in the immunity. After experiments, the dose of serum was reduced to 3·5 c.c. per 100 lb. body weight for cattle and 4·5 c.c. per 100 lb. for buffaloes.

The use of goat virus alone was introduced in Hyderabad in 1933 and 40,684 cattle have been immunized by this method. One goat will produce 400 to 500 c.c. of virus which is used in doses of 0·5 c.c., and is said to remain potent for 36 hours under field conditions. The reaction in cattle is said to be satisfactory, and no spread of infection to in-contact animals has been reported. Buffaloes were found to be highly susceptible to goat virus, and the serum-simultaneous method was more satisfactory for these animals than the use of goat virus alone.—U. F. R.

Jacotot, H. (1935). La muqueuse des voies digestives en tant qu'antigène vaccinant dans la peste bovine. [**The Antigen Content of the Mucous Membrane of the Digestive Tract in Rinderpest**].—*Bull. Soc. Path. exot.* **28.** 364-368. [2 refs.]

The author prepared glycerin-formol extracts of the necrotic mucous membrane from the oral ulcers of animals suffering from rinderpest. After keeping for six days in one case and 14 days in another, this material protected calves against an inoculation with rinderpest virus 12 days later. Other vaccines were prepared from the inflamed buccal mucous membrane of calves which had been inoculated with rinderpest six days previously, and from the mucous membrane of the abomasum, duodenum and caecum. Calves treated with the emulsion of buccal mucous membrane developed a febrile reaction after inoculation with virus, whilst those treated with the intestinal membrane developed diarrhoea ; no deaths occurred in either series.—U. F. Richardson.

Dobberstein, J., & Piening, C. (1935). Weitere Beiträge zur Kenntnis der Rinderleukose. [**Further Research on Leucosis of Cattle**].—*Z. InfektKr. Haustiere.* **47.** 265-282. 1 table. [19 refs.]

In a previous article [this *Bull.* **4.** 467.] these workers briefly described a form of bovine leucosis, apparently infectious in nature and caused by a filtrable virus. The properties of the virus have now been investigated. This agent is present in the blood and serum as well as in the altered tissues. The disease is readily transmitted by the simple injection of 100 to 200 c.c. of serum. Smaller injections produce milder reactions. Symptoms intervene after an incubation period varying from four to eight days. The virus withstands heating to 60°C. for 30 minutes, the action of 30 per cent. glycerin for three days and of 0·5 per cent.

phenol for the same period, but it is destroyed by drying within 30 days. The virus is bound to the globulin fraction of the blood serum and passes through a Berkefeld filter.

The authors have compared this virus with those of transplantable mouse sarcoma, fowl leucosis, Roux sarcoma and infectious anaemia, and they conclude that these are all closely allied to one another.—E. J. PULLINGER.

BALOZET, L. (1935). Etudes expérimentales sur l'anémie infectieuse des équidés. (1). [**Experimental Studies on Equine Infectious Anaemia. I**].—*Arch. Inst. Pasteur Tunis*. **24.** 268-306. 9 figs., 8 tables. [30 refs.]

This paper opens with a reference to the difficulty of carrying out experimental work on equine infectious anaemia owing to the absence of suitable susceptible laboratory animals. For some time past the author has employed the small North African donkey for this purpose. Although the disease in this animal is of small economic interest, an exact knowledge of it becomes essential if it is to be employed in connection with research work.

The author enumerates the advantages of this animal for laboratory purposes. It is cheap, readily obtainable, and the degree of susceptibility shown to the disease, contrary to popular belief, is equal to that of the horse. The symptoms shown are grave and well-defined. Three-year-old animals proved the most suitable for inoculation experiments.

The first part of the paper is a detailed account of the disease as shown in the donkey, based on the result of over 60 inoculations made with six strains of virus. As a result, the author has been able to fix the main characters of the disease in this animal. The second part records the author's experience with successive passage of the virus through donkeys ; part three deals with the question of reinfection of recovered animals ; part four is a study of the effect of certain chemical agents on the infectivity of the virus, and part five is devoted to preventive inoculation with formalized virus.—C. DAVENPORT.

PIENING, C. (1935). Die Veränderungen der Lymphknoten bei der ansteckenden Blutarmut des Pferdes. [**Changes in the Lymph Glands in Equine Infectious Anaemia**].—*Berl. tierärztl. Wschr.* **51.** 355-358. 4 figs. [20 refs.]

Cross sections of lymph glands of normal horses and of horses suffering from infectious anaemia were compared under low power magnification. The normal gland showed a network of trabeculae and obvious lymph follicles ; affected glands, on the contrary, appeared as almost homogenous bodies with no clear-cut differentiation between the lymphoid tissue and the connective tissue-supporting structure. Under high power magnification it was seen that this apparent homogeneity was due to hyperplasia of connective tissue elements of the intra-follicular supporting network. These findings support the view that the virus of infectious anaemia irritates and activates the mesenchyme elements.—E. J: PULLINGER.

ROSSI, P. (1935). La réaction de Fulton chez les chevaux brucelliques. [**Fulton's Reaction in Equine Brucellosis**].—*C. R. Soc. Biol. Paris*. **118.** 856-858. [2 refs.]

By adapting the mercuric chloride test used by BENNET and KENNY for the diagnosis of trypanosomiasis of camels [this *Bull.* **1.** 185.] FULTON was able to diagnose cases of infectious anaemia of horses. The test is carried out by adding one drop of serum to varying strengths of a mercuric chloride solution, precipitation at a high dilution being judged as evidence of infection. The author carried out the test in horses suffering from *Br. abortus* infection, but the results were not

in agreement with those of the agglutination test. Several of the affected horses, however, gave a marked reaction and it is concluded that the possibility of *Br. abortus* infection must not be overlooked when the test is used for the diagnosis of infectious anaemia.—F. BLAKEMORE.

REESER, H. E. (1934). Het verband tusschen stomatitis pustulosa contagiosa van het paard en pokken. [**Relation between Contagious Pustular Stomatitis of the Horse and Pox Diseases**].—*Versl. Rijksseruminricht. 1933.* pp. 40-47.

Following the investigations of DE JONG and VAN HEELSBERGEN (1918), who found that equine contagious pustular stomatitis was identical with horse pox, the author attempted a study of the relation of this virus of horses to that of fowl pox. Material from foals naturally affected with equine pustular stomatitis was used for the experimental infection of another foal, some sheep and a calf – all with negative results. It was passed successfully through one rabbit to two pigeons (one positive and one negative result) and from the positive pigeon successively and successfully through several other pigeons and finally to a few fowls, producing in the latter a clinical disease similar to fowl pox. An attempt to infect a foal from one of these fowls yielded a negative result.

This virus of pustular stomatitis of foals differed from that of fowl pox in two respects, viz. the incubation period of the former was one or two days less and – contrary to the case with fowl pox virus – the virulence for birds gradually decreased until it disappeared altogether after passage through ten pigeons and 12 fowls. —J. VAN DER HOEDEN (UTRECHT).

BRUNETT, E. L. (1934). **Some Observations on [Avian] Pox Virus Obtained from a Turkey.**—*Rep. N.Y. St. vet. Coll. 1932-1933.* pp. 69-70. 1 table. [6 refs.]

Experiments carried out with the virus isolated from an outbreak of pox in turkeys showed the virus to be indistinguishable from the type commonly encountered in fowls. Pigeons were resistant to the turkey virus. Turkeys proved very susceptible to feather follicle inoculation with pigeon pox virus, but the pigeon pox virus produced no immunity in turkeys against the turkey or fowl pox viruses. —R. F. GORDON.

AKAZAWA, S., & MATSUMURA, T. (1935). **Swine-Pox in Chosen.**—*J. Jap. Soc. vet. Sci.* **14.** 1-19. 5 figs. on 3 plates. [6 refs.] [Abst. from English summary].

A general description of an outbreak of swine pox in Chosen. It was reproduced experimentally and proved to be immunologically allied to vaccinia ; it was identified as true swine pox.—J. E.

WAHL, F. (1935). Anämie und Ferkelgrippe. [**Anaemia and Swine Influenza**]. —*Berl. tierärztl. Wschr.* **51.** 385-391. 1 fig., 8 tables, 3 graphs. [44 refs.]

The erythrocyte count and haemoglobin content of a litter of seven piglets was studied, and it was shown that in every case the erythrocyte count and haemoglobin content dropped steadily after birth until the ninth day, after which these figures rose steadily. The weight of the animals rose continually from birth, except for a very slight check about the ninth day. Shortly after birth the average erythrocyte count was four to five million, dropping to about three million by the ninth day ; the haemoglobin content dropped from about 52 per cent. to 35 per cent. The original condition of the blood was regained about three weeks after birth. This type of anaemia is called physiological anaemia and is thought to be associated with a lag in the uptake of iron. Infection of piglets with swine influenza

a few weeks after birth produced no sudden onset of anaemia comparable with the above physiological type, though infected animals ceased to gain weight.—E. J. P.

I. Laidlaw, P. P., Smith, W., Andrewes, C. H., & Dunkin, G. W. (1935). **Influenza : The Preparation of Immune Sera in Horses.**—*Brit. J. exp. Path.* **16.** 275-290. 8 tables, 2 charts. [10 refs.]

II. Smith, W., Andrewes, C. H., & Laidlaw, P. P. (1935). **Influenza : Experiments on the Immunization of Ferrets and Mice.**—*Ibid.* 291-302. 5 tables. [6 refs.]

III. —. (1935). **The Influenza Virus in Relation to Prophylaxis and Treatment.** —*Lancet.* **229.** 27.

I. Preliminary experiments having shown that the horse is insusceptible to large doses of influenza virus, a series of three animals was hyperimmunized by the subcutaneous inoculation of emulsions of infective tissues from ferrets.

Their sera were tested for potency by various methods. " Gradocol " membrane filtrates, prepared from the lungs of infected mice, were added to serial dilutions of serum, and the mixtures were inoculated intranasally into mice. With one serum a dilution of 1 : 30 afforded complete protection. Large doses of serum, administered 45 minutes before the virus, conferred a certain degree of passive immunity. Incidentally, it was noted that normal horse serum, given under similar conditions, appeared to diminish the severity of the symptoms although it did not materially alter the extent of the lung lesions. Serum given up to 48 hours after the virus also had a marked retarding effect. Fractionation of hyperimmune serum showed that the greater part of the activity resided in the pseudoglobulin portion. The concentrated antibody was more efficacious than the original serum in conferring an immunity to mice when given either before the virus, or up to a period of 48 hours after the virus. Evidence was also obtained that the human and porcine strains, although related, were antigenically different.

II. In this article, a series of experiments on immunity against influenza is described. In the ferret, vaccines inactivated by heat, by formalin or by methylene blue irradiation failed to produce an active immunity, while the subcutaneous inoculation of comparatively large doses of living virus was also without effect, since vaccinated animals were fully susceptible to infection by the nasal route. Such animals, however, showed neutralizing antibodies ; moreover, when tested by an intrapulmonary inoculation, the lungs were partially protected against the action of the virus. Ferrets recovered from infection were completely resistant for three months. Thereafter the immunity waned, but could be reinforced by further doses of living virus.

In mice, immunized with multiple subcutaneous injections of virus, the course of the disease was modified, although 50 per cent. of the vaccinated animals showed some degree of lung involvement when killed six days later. Small doses of virus given intradermally appeared to give as effective a protection as larger amounts subcutaneously.

III. An editorial on the above two papers.—R. E. Glover.

Chluszow, K. A., Ponomarew, A. W., & Rastegajewa, A. M. (1935). Subarachnoidale Uebertragung zur Hervorrufung der experimentellen Encephalo-myelitis (Borna'schen Krankheit) des Pferdes (E.-m). **[Subarachnoid Transmission of Borna Disease].**—*Dtsch. tierärztl. Wschr.* **43.** 452-455. [4 refs.]

The authors describe a method of inoculating material containing virus of Borna disease into the subarachnoid space of laboratory animals. This technique

almost invariably produces successful infection of rabbits, though intravenous or intracerebral inoculation frequently fails to produce satisfactory results.

To perform the inoculation, the rabbit is anaesthetized or firmly tied down in the ventral position. A blunt, short-pointed needle is passed through the skin and muscle just behind the occipital bone and down through the occipito-atlantal space to pierce the occipito-atlantal membrane. As much cerebrospinal fluid as possible is withdrawn into a syringe (usually 0·5 to 1·5 c.c.). A fresh syringe is then put on to the needle through which the dose of virus is administered slowly.

—E. J. Pullinger.

Rossi, & Colin. (1935). La maladie d'Aujeszky existe réellement en France (deuxième note). [**Aujeszky's Disease in France. II**].—*Bull. Soc. Sci. vét. Lyon.* **38.** 51-54. [1 ref.] [For abst. of previous article of this series, see this *Bull.* **5.** 558].

In this article further details are given of the transmission of the French strain of Aujeszky's disease to laboratory animals.—R. E. Glover.

Steiner, A., & López, C. (1935). Descubrimiento de la enfermedad de Aujeszky en España. [**Aujeszky's Disease in Spain**].—*Rev. Hig. Sanid. pecuar.* **25.** 330-334. [22 refs.] [Abst. from *verbatim* translation in *Rev. gén. Méd. vét.* **44.** 257-261].

The authors report the existence of Aujeszky's disease (infectious bulbar paralysis, pseudorabies, mad itch) amongst swine in Spain. The mortality was not very high (14 per cent.) and the symptoms were mild, consisting of a sharp rise in temperature, a slight cough and a posterior paralysis. The presence of the virus was demonstrated by the subcutaneous inoculation of rabbits with emulsions of various organs. A suspension of spleen pulp is recommended in preference to cerebral tissue for the detection of the virus.—R. E. Glover.

Traub, E. (1935). **Multiplication in vitro of Pseudorabies Virus in the Testicle Tissue of Immunized Guinea Pigs.**—*J. exp. Med.* **61.** 833-838. 2 tables. [9 refs.]

A series of guinea pigs was immunized by the subcutaneous inoculation of a brain emulsion containing the Iowa strain of Aujeszky's disease virus. The animals subsequently resisted the intratesticular inoculation of from 100 to 1,000 M.L.D. of a culture virus of the same strain.

The susceptibility of the tissues of these animals to the virus was tested in the following manner. Washed testicular tissues from normal and immune guinea pigs respectively were suspended in a mixture of Tyrode's solution and guinea pig serum. These emulsions were then sown with 0·1 c.c. of a Berkefeld candle filtrate of the virus and grown for 48 hours. The titres of the original cultures and of subcultures were determined by the intraperitoneal inoculation of mice.

It was found that the virus grew in immune testis, but to a less degree than in normal testis. This suggested that the testicle cells had not become immune to the virus, but that some inhibition in growth occurred owing to the presence of small amounts of humeral antibodies which were not removed even after thorough washing of the tissues.—R. E. Glover.

Levaditi, C., & Schoen, R. (1935). Les corpuscules oxyphiles cornéens en rapport avec les diverses souches de virus rabique des rues. [**A Comparison of the Corneal Oxyphilic Inclusion Bodies Produced by Different Strains of Street Rabies**].—*C. R. Soc. Biol. Paris.* **119.** 463-466. [2 refs.]

An examination of three strains of rabies street virus has shown that there is no direct relationship between the capacity to form Negri bodies in the central nervous system and the presence of oxyphilic bodies in the corneal cells, since a virus which induces sparse and small Negri bodies may produce numerous corneal inclusions and *vice versa*. In addition, alternate passage experiments from brain to cornea may convert a virus with a low Negri body capacity into one which is highly potent in this respect.—R. E. GLOVER.

ROBIMARGA, V. (1934). L'agalassia contagiosa. Terapia e profilassi immunitaria. **[Contagious Agalactia: Treatment and Immunization].**—*Critica zootec.* **11.** 155-175.

Contagious agalactia is a specific disease of sheep and goats which is seen more commonly in lactating animals, but also occurs in animals of either sex and any age. The characteristic lesions are mastitis, arthritis and keratitis and ulceration of the cornea. Peritonitis, haemorrhagic foci in the kidneys and intestines, pleurisy and inflammation of lymphatic glands are also common lesions. The disease runs an acute or chronic course; in the latter case animals may remain affected for several years. Those animals which recover remain immune for life. The disease may be artificially reproduced by the subcutaneous inoculation of infected milk, articular exudate, etc., which has been previously passed through a Chamberland candle. It may also be reproduced by giving such filtrates by the mouth. The virus may be grown aerobically or anaerobically in serum broth. Anaerobic cultures retain their virulence for 22 months. The author has established that the virus is very susceptible to acids, and has been able to immunize susceptible animals by the subcutaneous injection of whey obtained from the acidified milk of affected animals.—J. A. NICHOLSON.

STUBBS, E. L. (1935). **The Transmission of Fowl Leukosis with Desiccated Blood.**—*J. Amer. vet. med. Ass.* **86.** 721-725. 1 fig. [3 refs.]

Blood was taken from a fowl affected with typical erythroleucosis and dried from the frozen state *in vacuo* over phosphorus pentoxide. The desiccated blood was kept in sealed test tubes in a refrigerator and inoculated into groups of chickens at various intervals after desiccation.

Chickens became affected with leucosis in all groups except one. The percentage of chickens affected in a group varied from 33·3 to 66·6. From these experiments it appears that the causal agent of transmissible leucosis retains its activity in the dried state for 932 days.—R. F. GORDON.

I. BURNET, F. M. (1934). **Psittacosis in Australian Parrots.**—*Med. J. Aust.* Dec. 8th. 743-746. 4 tables. [2 refs.]

II. —. (1934). **Psittacosis in Australia.**—*Ibid.* Dec. 15th. 791.

I. It has been generally assumed that psittacosis is not present in Australia, but certain reports led the author to examine a number of apparently normal native parrots for the presence of psittacosis virus. A large proportion of birds had enlarged spleens and, when bacteria-free emulsions of these spleens were inoculated into mice, lesions typical of psittacosis were produced. The virulence of different strains of virus for mice varied, but on the whole these strains appeared to be less virulent than those isolated from cases of human infection in the European and American outbreaks of 1929 to 1930. It is possible that Australian strains of the virus are non-virulent for man, but it is more likely that they are occasionally responsible for human infections and it is recommended that a careful watch be kept for such cases.

II. This is a short leading article calling the attention of readers to the above and requesting that any suspicious sickness in man or birds be reported.—W. I. B. B.

Lombardo, F. (1935). Experienze sulla presenza del virus tifico esantematico del Mediterraneo nei cani. **[The Virus of Mediterranean Typhus in Dogs].** —*Ann. Igiene* (*sper.*) **45.** 1-6. 1 table. [14 refs.] [Copied *verbatim* from *Trop. Dis. Bull.* **32.** 576. Signed H. H. S.]

The author tested the sera of 50 dogs in Messina for their agglutinating activities with Proteus X19. Thirty-one agglutinated in dilution of 1 : 25 or over, thirteen in 1 : 50, seven in 1 : 100 and four up to 1 : 200. Ticks caught on these dogs were triturated and injected into guineapigs and produced a febrile reaction and in some cases enlargement of the spleen. Human cases of the disease, states the author, are not found in the Commune.

Lépine, P., & Lorando, N. (1935). Le typhus exanthématique du chat. **[Exanthematic Typhus in the Cat].**—*Bull. Soc. Path. exot.* **28.** 356-360. [1 ref.]

The authors record a case of human typhus in which the owner's cat was suspected of providing the source of virus. The brain of this animal inoculated into guinea pigs caused a typhus reaction and the appearance of rickettsia. Fleas from the cat were also shown to harbour the typhus virus. Eight cats from the same area were examined but only one other was proved to be a virus carrier. Cats fed on the spleen and brain of infected guinea pigs showed no clinical reaction, but their brains proved infective on subinoculation into guinea pigs. The authors conclude that the cat does not readily contract typhus, and does not retain infection for a prolonged period, but that it may become infected by the bites of rat lice or by eating infected rats, and it must be considered as a potential source of human disease.—U. F. Richardson.

Gordon, M. H. (1935). **Agglutination of Virus Bodies. [Correspondence].**—*Lancet.* **228.** 1527-1528.

Ledingham, J. C. G. (1935). **Agglutination of Virus Bodies. [Correspondence].** —*Ibid.* **229.** 45-46.

Gordon, M. H. (1935). **Agglutination of Virus Bodies. [Correspondence].**—*Ibid.* 104-105.

The main point of interest in these letters is the discussion on the value of the agglutination of particles in various virus infections. Gordon is strongly of the opinion that the macroscopic method of observing the flocculation of virus bodies by specific sera is to be preferred, while Ledingham holds the view that the microscopic agglutination of washed elementary bodies is more accurate since it represents a simple, uncomplicated reaction. The correctness of this point of view is challenged by Gordon.—R. E. Glover.

## INVERTEBRATE VECTORS OF DISEASE.

Herms, W. B., Wheeler, C. M., & Herms, H. P. (1934). **Attempts to Transmit Equine Encephalomyelitis by Means of Blood Sucking Insects, especially Mosquitoes.**—*J. econ. Ent.* **27.** 987-998. 3 figs. [3 refs.]

Four species of blood sucking insects were tried, *Haematobia serrata* the horn fly, *Tabanus punctifer* the black and white horse fly, and the mosquitoes *Aedes dorsalis* and *Anopheles maculipennis*. All efforts to transmit infection from infected horses to guinea pigs with *H. serrata* and from infected to healthy horses

with the species of *Tabanus* gave negative results. The authors also failed to transmit infection from inoculated to healthy guinea pigs with mosquitoes. [Kelser (1933)—this *Bull.* **4.** 107.—using *Aedes aegypti*, succeeded in transmitting infection to guinea pigs and horses].—Gwilym O. Davies.

Ratcliffe, H. L., & Stubbs, E. L. (1935). **Attempts to Transmit Chicken Leukosis by Mosquitoes and by Mites.**—*J. infect. Dis.* **56.** 301-304. [7 refs.]

Fowl leucaemia can be transmitted experimentally by intravenous inoculation of leucaemic blood, and the experiments recorded were carried out to determine whether or not two species of mosquitoes, *Culex pipiens* and *Aedes aegypti*, and the red mite *Dermanyssus gallinae* might act as vectors of this disease. The causative agent of fowl leucaemia became inactivated within 24 hours in mosquitoes and mites. There was no evidence that the causative agent undergoes part of its life cycle in mosquitoes. All attempts to transmit fowl leucaemia by alternate interrupted feedings, first on leucaemic and then on healthy fowls, by these species of mosquitoes and by mites were negative.—R. F. Gordon.

Hegh, E. (1934). Les quatorze espèces de tsé-tsés du Congo Belge. [**The 14 Species of *Glossina* in the Belgian Congo**].—*Bull. agric. Congo. belge.* **25.** 628-635.

Fourteen of the 21 known species of tsetse are found in the Belgian Congo. In the present paper the chief characteristics of these are briefly described. Following Austen [(1911) " A Handbook of Tsetse Flies (genus Glossina) "] the genus is divided into four groups, the species represented in each group in the Congo being as follows :– (a) small species – group *palpalis* :– *G. palpalis*, *G. pallicera* and *G. newsteadi* ; (b) small species - group *morsitans* :– *G. morsitans*, *G. submorsitans*, *G. pallidipes* and *G. longipalpis* ; (c) large species – group *fusca* :– *G. fusca*, *G. fuscipleuris*, *G. tabaniformis*, *G. schwetzi*, *G. haningtoni* and *G. severini*, and (d) large species – group *brevipalpis* :– *G. brevipalpis*.—J. S. Steward.

—. (1935). **Report of Committee on Tick Eradication** [**U.S. Live Stock Sanit. Ass.**].—*J. Amer. vet. med. Ass.* **86.** 434-435.

This report covers the progress of tick eradication in the United States of America. Nineteen counties are engaged in tick eradication, 15 are inactive, and 254 have been released as clean. The finding of *Boophilus annulatus australis* in Florida is regarded as important in view of the greater difficulty in its eradication. The introduction of regulations preventing movement of cattle from inactive counties is urged as an incentive to action.—U. F. Richardson.

Minning, W. (1934). Beiträge zur Systematik und Morphologie der Zeckengattung Boophilus Curtice. [**A Contribution to the Classification and Morphology of the Tick Genus *Boophilus***].—*Z. Parasitenk.* **7.** 1-43. 34 figs. [54 refs.]

The author divides the genus *Boophilus* into three subgenera :– *Boophilus*, including the species *B. annulatus* and *B. calcaratus* ; *Uroboophilus*, which includes the species *B. caudatus* and *B. australis*, and *Palpoboophilus* with the single species *B. decoloratus*. Members of the subgenus *Boophilus* occur in North America and round the shores of the Mediterranean ; the subgenus *Palpoboophilus* is confined to Africa, whilst species of *Uroboophilus* occur in Asia, Africa, South America and Australia. *Boophilus* is characterized, in the male, by the absence of caudal appendices and the slight development of the projections on coxae II and III, and in the female by the size and smooth lower margins of coxae II and III. In *Uro-*

*boophilus* caudal appendices are present, and the projections on coxae II and III are well-marked in the males, and the females also possess distinct projections on these coxae. The subgenus *Palpoboophilus* is characterized by the presence of bristles on the inner side of the knob-like process which occurs on the first palpebral joint.

The following new species are described :– *B. schulzei*, North America and the West Indies ; *B. congolensis*, French Congo ; *U. fallax*, Tanganyika Territory, Madagascar and South Africa ; *U. sharifi*, India and Ceylon ; *U. distans*, China and Japan ; *U. sinensis*, China and Japan ; *U. krijgsmani*, Borneo, Sumatra and New Guinea ; *U. rotundiscutatus*, the East Indian Archipelago ; *U. longiscutatus*, New Guinea, and *U. cyclops*, Costa Rica, Panama and Guatemala. The article gives keys to the differentiation of both male and female specimens of the various species.—U. F. Richardson.

McMichen, B. (1934). **The Prevalence of Ticks (Ixodes holocyclus) at Koala Park, Pennant Hills, N.S.W.**—*Aust. vet. J.* **10.** 180-181.

*I. holocyclus* has been observed on the following native animals in the park :– the great grey kangaroo (*Macropus giganteus*), the red kangaroo (*M. rufus*), Tasmanian wallabies (*M. ruficollis bennetti*), wallabies from the coastal tablelands of New South Wales (*M. parryi*, *M. ruficollis*, *M. nalabatus*), Koala bear and bandicoot (*Perameles nasuta*). The only ill effects appeared to have occurred in the case of some of the Tasmanian wallabies, several of which died. Numerous engorged *I. holocyclus* were found on them *post mortem*. It would appear that many of the native animals are immune to the venom of *I. holocyclus*.—H. McL. Gordon.

## DISEASES CAUSED BY METAZOAN PARASITES.

Dikmans, G. (1935). **Parasites of Cattle in Costa Rica.**—*Proc. helminth. Soc. Wash.* **2.** 83.

Dikmans records the finding of *Mecistocirrus digitatus* in a collection of parasites from cattle in Costa Rica. Within a period of only 12 months this is the third reported occurrence in the Western Hemisphere of nematode genera from domestic ruminants previously reported only from Asia. The other two genera are *Elaeophora* and *Stephanofilaria*.—E. L. Taylor.

Hall, M. C., Price, E. W., & Wright, W. H. (1934). **Parasites and Parasitic Diseases of Dogs.**—*Dep. Circ. U.S. Dep. Agric.* No. 338. pp. 34. 33 figs.

This very useful bulletin is a revised edition of the one which was published under the name of the senior author in 1925. It contains all the necessary practical information on the more important arthropod, helminth and protozoan parasites found in dogs in North America and has been enlarged from the previous compass of 28 pages up to 34 pages in its new form.—E. L. Taylor.

Hellesnes, P. (1935). Rensnyltere. [**Parasites of Reindeer**].—*Norsk VetTidsskr.* **47.** 117-137 and 194-204. 15 figs. [34 refs.] [English summary : abst. from orig.]

This article is a communication from the State Veterinary Clinic, Oslo, where the author has recently carried out methodical *post-mortem* examinations on the viscera of reindeer, in order to throw more light on the parasites of that animal. The material was collected either by a representative from the clinic who visited the site of slaughter, or it was sent in by veterinary surgeons living in areas where

reindeer are kept. Altogether, the viscera from over 300 animals were included in these examinations. Along with the author's own findings, which are described in detail, results of other investigators who have worked on this particular subject are quoted from the literature. The article thus constitutes a survey of the whole subject.

The following species have been found by the author, or have been reported by others, as occurring in the Norwegian reindeer :– (1) *Moniezia* n.sp. [reported by NATVIG (1927)] ; (2) *Cysticercus tenuicollis*, found by the author in about 20 per cent. of the cases examined ; *C. tarandi* [reported by TELLEFSEN (1896)] ; (3) *Echinococcus polymorphus*, found by the author in about 10 per cent. of the animals examined, in every case in the lungs only ; (4) *Skrjabinema tarandi* Skrjabin and Mizkewitsch, 1930, found in practically every animal examined ; (5) stomach-worms present in nearly every abomasum examined : three males, but no females, found of an unknown *Trichostrongylus* or related species ; *Ostertagia ostertagi* Stiles, 1892, frequently found, also *Ostertagia* n.sp., a new species resembling *O. trifurcata* Ransom, 1907, and *O. arctica* Mizkewitsch ; (6) lungworms found by the author in 14 out of 30 lungs examined : they were two species of *Dictyocaulus*, one probably identical with *D. eckerti* Skrjabin and the other one evidently not previously described, and (7) *Trichuris ovis* Abildgaard, 1755, occasionally found.

With regard to external parasites, NATVIG mentions different species of Tabanidae, Culicidae and Simulidae. Far more important, however, are the two species of Oestridae, *Cephenomyia trompe* L. and *Oedemagena tarandi* L., which are very troublesome in summer-time. MJÖBERG (1916) described the reindeer louse, *Cervophtirius tarandi*, which is said to be present in moderate numbers only.—GUSTAV NAERLAND (FARSUND).

PETERSEN, G. (1935). Oksebremselarvens Forekomst i Danmark i 1930-34. [**Ox Warbles in Denmark from 1930 to 1934**].—*Maanedsskr. Dyrlaeg.* **46.** 509-515. 2 figs.

In 1923 an act was passed for combating ox warbles throughout the country. This article records the results obtained up to 1934. In the Danish islands the parasite is practically exterminated : infested herds can still be found in only a few localities. At the outset there were about 5 to 10 per cent. of infected herds in the islands, whilst in the different counties of Jutland the percentage was 20 to 80. Here the campaign shows the poorest results, as the owners of cattle on an average have taken very little interest in the scheme. Hitherto the inspection of herds has been performed by a man appointed by the local authority (generally a layman). In future an additional inspection will be performed in all the infested herds by a veterinary surgeon about four weeks after the first inspection.

—H. C. BENDIXEN (COPENHAGEN).

AUSTRALIA, QUEENSLAND. (1934). **Twelfth Annual Report of the Walter and Eliza Hall Fellow in Economic Biology, Queensland University, Brisbane. [Blowfly Control].** [HARDY, G. H.] pp. 17. [30 refs.] [Typescript].

From tests whereby maggots are placed in large numbers in the fleece of normal sheep, it is concluded that all sheep are normally immune to blowflies. In the uncontaminated fleece there is insufficient food for maggots to develop. The growth of the maggots in contaminated fleece will be achieved in so far as the bacterial action will release more of the potential food. The rapidity of the growth of maggots is in proportion to the food intake, and the number of days through which maggots may pass an instar can be reduced considerably. The scheme of

retarding early growth has an application in preparing maggots for surgical use. Bacteria apparently have no nutritional value for maggots, but are capable of softening the food medium and breaking down animal tissues, thus making food materials available.

The conclusion of other workers that bacteria are primarily the cause of blowfly strike is supported. It is suggested that a medium to act both against bacteria and maggots is the ideal. It is pointed out that an acid reaction is inimical to maggots. A note is added on two new methods used in the breeding and preparing of maggots for surgical purposes ; these methods embrace the retarding of growth of maggots and the sterilization of blowfly eggs. A bibliography of literature on the blowfly problem issued by the Walter and Eliza Hall Fellow in Economic Biology is included in the report.—H. McL. Gordon.

Holdaway, F. G., & Mulhearn, C. R. (1934). **Field Observations on Weather Stain and Blowfly Strike of Sheep with Special Reference to Body Strike.** —*Pamphl. Coun. sci. industr. Res. Aust.* No. 48. pp. 35. 7 figs., 13 tables. [20 refs.]

During unusually wet seasons blowfly strike occurs in merino sheep about the withers, back or loins and strike in these situations is termed " body strike " to distinguish it from strike in the more usual sites. Extensive field observations in several districts were carried out on more than 12,000 sheep in order to determine the factors contributed by the sheep towards susceptibility to this type of strike. It has been shown that a condition of the fleece known as " weather stain ", which is due to bacterial activity, is the forerunner of body strike. The clinical appearance of various types of weather stain are described. The wither was found to be more susceptible to weather stain and body strike than the loin. The degree of susceptibility of sheep to both weather stain and body strike was proportionate to the intensity of yellow coloration of the yolk. Weather stain and body strike were more common in sheep with dense fleeces than in sheep whose fleeces were less dense, owing probably to dense fleeces being more favourable for bacterial growth. However, in one flock in which the large majority of the sheep were affected with weather stain, the sheep with the less dense fleeces were more susceptible to strike.

The authors advance evidence that yellow yolk is identical with " golden coloration " of Rimington and Stewart and, therefore, that the intensity of yolk colour is an indicator of the proportion of sweat in the yolk. High sweat concentration is therefore considered to be a factor in predisposing to strike. The density of the fleece as a factor in susceptibility is related to the concentration of sweat, as was shown by an observation that the sheep with densest fleeces usually had the darkest coloured yolk. Data were obtained which, although not significant statistically, suggested that there is a relation between susceptibility to crutch strike as judged by the incidence of the latter or by the degree of wrinkliness of the crutch.

Quantitative data on which the above conclusions are based were treated statistically and set out in a series of tables.—W. I. B. Beveridge.

Fuller, Mary E. (1934). **Sheep Blowfly Investigations. Some Field Tests of Baits Treated with Sodium Sulphide.**—*J. Coun. sci. industr. Res. Aust.* **7.** 147-149. 4 tables. [2 refs.]

Traps with baits treated with sodium sulphide caught a larger number of flies and remained attractive longer. If they did not catch a considerably higher percentage of primary flies, at least they did not discriminate against the secondaries.
—H. McL. Gordon.

Fuller, Mary E. (1934). **Observations on the Flies Responsible for Striking Sheep in Western Australia.**—*J. Coun. sci. industr. Res. Aust.* **7.** 150-152. 1 fig., 1 table. [1 ref.]

The author records species of blowfly trapped in Western Australia. These include *Calliphora australis, C. nociva, Lucilia cufrina, Chrysomyia* [*Cochliomyia*] *rufifacies* and *Peronia rostrata.*—H. McL. Gordon.

Evans, A. C. (1935). **Studies on the Influence of the Environment on the Sheep Blow-Fly, *Lucilia sericata* Meig. II. The Influence of Humidity and Temperature on Prepupae and Pupae. III. The Influence of Humidity and Temperature on the Adult.**—*Parasitology.* **27.** 291-298 and 299-307. 10 figs. [12 refs.]

In the first paper of this series [this *Bull.* **5.** 24.] Evans studied the effect of temperature and humidity on the egg of *L. sericata.* In the second paper the effect on the prepupal and pupal stages is discussed. It was found that weight was lost more rapidly at low humidities than high. Humidity was shown to have but little effect on the duration of the prepupal and pupal stages as compared with its effect on the rate of development of the egg. Pupation occurs more rapidly at low than high humidities, but most rapidly at moderate humidities. The limits of temperature and humidity are given at which each of the two stages can survive.

In the third paper Evans discusses the length of life at various humidities of fed and unfed flies. The continued feeding of flies brought about a shortening of life at all humidities when the flies were starved later, owing to their increased rate of metabolism. Flies fed on sugar and water were more resistant to humidity than flies fed on meat, sugar and water, and females were more resistant than males. High humidity was found to be more favourable for growth of the ovaries than low humidity. Between 10 to 35°C. humidity had no effect on oviposition, but low humidity was unfavourable at 40°C.—J. S. Steward.

Beveridge, W. I. B. (1934). **Some Field Observations on the Blowfly Problem.** —*Aust. vet. J.* **10.** 64-67.

There was a considerably higher incidence of strike in sheep running in paddocks through which a creek flowed than in paddocks where the only surface water was in dams or troughs. It is suggested that the higher atmospheric humidity along creeks favours bacterial activity in the fleece and on the skin of the sheep, thus rendering the sheep more attractive to the fly and more susceptible to strike.

Sheep less than one year old are more often struck about the back and withers than are older sheep. The shorter wool on young sheep may account for their being more susceptible to " water-rot ", and consequently to body strike, than older sheep. It was observed that crutch strike in ewes commenced on the left side in 70 per cent. of cases. Many vulvae were noticed to be distorted to the left and this distortion is believed to be responsible for more marked staining and strike on the left side. It has been noted that ewes during the last month of pregnancy are seldom struck and it is thought that less wetting and staining by urine occurs owing to the enlarged state of the vulva in the pregnant ewes.

Jetting not only reduces the number of sheep struck, but also lessens the severity of strikes which do occur. When dressing struck areas it is better to remove maggots mechanically than to rely on an irritant dressing material to kill or remove them. Contact larvicides act by virtue of physical properties, usually surface tension, hence their effectiveness will vary with the temperature, likewise volatile repellents. Wounds produced at lamb marking are often struck by flies. Dressings applied at the time of marking are usually washed away by bleeding and are thus

ineffective. If the wounds are severe it is better to dress them on the second or third day after the operation.—H. McL. Gordon.

Brownlee, A. (1935). **A Species of Demodex found in Sheep in Britain.**—*J. comp. Path.* **48.** 68-73. 1 fig., 2 tables. [3 refs.]

Brownlee records the occurrence of a species of demodex in sheep in Scotland. They were found most frequently in the sebaceous glands of the skin in the region of the vulva and prepuce. There was no indication that the parasites were of any pathogenic significance, though they were found more frequently in debilitated and emaciated sheep than in sheep in good physical condition.

There was a previous record of demodex in sheep in this country – Hirst having found the parasites in the meibomian glands of a recently slaughtered sheep.

The measurements of the mite described by Brownlee are considerably greater than those quoted by Hirst, and it is suggested that it may represent a species distinct from that recorded by him.—J. S. Steward.

Manley, F. H. (1935). **A Note on Caprine Demodectic Mange.**—*Vet. Rec.* **15.** 118-120. 6 figs. [4 refs.]

The author states that it is often difficult to isolate demodex from cases of caprine demodectic mange in Cyprus. The lesions of one case were examined by cultural methods ; no organisms were isolated, but a goat inoculated with the caseous contents of the nodules developed pustules at the site of inoculation after 25 days, followed by death in four days. A *post-mortem* examination revealed acute broncho-pneumonia and suppurative foci in the liver. From these lesions an organism was isolated which was not identified but was believed to be a type of streptothrix. The organism was pathogenic for rabbits and a goat inoculated subcutaneously developed caseous nodules from which the organism was recovered. The author considers that this organism may be associated with demodex in the production of a nodular skin disease of goats.—F. Blakemore.

Baigar, F. (1934). Vsi domácích zvířat. [**The Lice of Domestic Animals**].—*Biol. Spis. vys. Sk. Zverolék.* **13.** 71-98. 8 figs. [13 refs.] [Abst. from German summary].

A well-illustrated account of the common lice of domestic animals in Central Europe. They include *Haematopinus asini* from equines, *H. eurysternus, Solenopotes capillatus* and *Linognathus vituli* from cattle, *H. suis* from pigs, *L. ovillus* from sheep, *L. stenopsis* from goats and *L. setosus* from dogs.

The morphology of all these is described both in the original Czech and in the German summary, and a special table has been prepared to facilitate the identification of these lice.—J. E.

Parnell, I. W. (1935). **Some Methods of controlling the Spreading of Internal Parasites of the Horse.**—*J. R. Army vet. Cps.* **6.** 138-141.

This is an account of an investigation into the control of sclerostomiasis of horses. The author first reviews in brief the life-history of the parasite and shows that effective methods of control must be directed against the free-feeding larval form. He points out the great resistance to extremes of temperature and other influences shown by the egg before embryonation and by the larvae on attaining the infective stage. He finds that the problem resolves itself into one of the treatment of manure by physical or chemical agencies which for economic purposes must be such that they do not impair its value in any way.

Desiccation, freezing and heating are considered in turn. The first is found

only suitable in dry tropical countries. The second is valueless. The third can be employed by making use of the heat generated in the close packing of manure heaps according to the method of Schwartz.

The author's chief work, however, has been in connection with chemical agents, among those studied being urine, urea, nitrate of soda, sulphate of ammonia and muriate of potash. He finds that the first-named fulfils every requirement, being cheap, easily obtainable and harmless to plant and animal life. Since it actually enhances the manurial value of the heap treated it is admirably suited for the purpose.—C. DAVENPORT.

DIKMANS, G. (1934). **New Records of Helminth Parasites.**—*Proc. helminth. Soc. Wash.* **1.** 63-64.

Dikmans records the finding of a number of trichostrongylid species in a deer. *Skrjabinema ovis* is recorded from a goat in Massachusetts, a species of *Macdonaldius* from a sheep in New Mexico, *Haemonchus similis* and *Cooperia pectinata* from cattle in Florida and *Moniezia benedeni* from *Ovis canadensis* and the buffalo.—E. L. TAYLOR.

MCCOY, O. R. (1935). **The Physiology of the Helminth Parasites.**—*Physiol. Rev.* **15.** 221-240. [70 refs.]

This paper summarizes some of the experimental work on helminths which touches upon their physiology. The parasitic existence shows its influence on the physiology of helminths principally in modifications of secretions, reproduction and metabolism ; the elaboration of anti-enzymes, anti-coagulins and histolytic ferments ; the great development of the reproductive system, and the adaptation to low oxygen tension by the development of an anaerobic type of metabolism in which glycogen is split into carbon dioxide and fatty acids. The author points out the wide differences between the physiological processes of the free-living larval stages and those of the parasitic adults.—E. L. TAYLOR.

SPINDLER, L. A. (1934). **The Incidence of Worm Parasites in Swine in the Southern United States.**—*Proc. helminth. Soc. Wash.* **1.** 40-42. 1 table.

Spindler reports on parasitic worms found in 348 pigs, mostly between six and 12 months old, from Georgia and Florida. In addition to this the findings in a further 1,075 pigs examined for kidney worm are given. In the order of their incidence the most common worm parasites were *Oesophagostomum* spp., *Stephanurus dentatus*, *Metastrongylus* spp., *Choerostrongylus pudendodectus*, *Acarops strongylina*, *Physocephalus sexalatus* and *Macracanthorhynchus hirudinaceus*. Most of the pigs were infested with between four and 11 species, and none were entirely free from worm parasites.—E. L. TAYLOR.

ROSS, I. C. (1934). **Improved Pastures and Parasitic Infestation of Sheep.**—*J. Coun. sci. industr. Res. Aust.* **7.** 131-133.

It is concluded from recent experiments that increased risk of parasitism, anticipated on theoretical grounds owing to heavier stocking on improved pastures, is frequently more than compensated for by the improved nutrition of the animals. Nevertheless it must be recognized that, where improved pastures are injudiciously managed or overstocked, risk of grave parasitic infestation may still exist.

—H. MCL. GORDON.

BHALERAO, G. D. (1935). **Helminth Parasites of the Indian Elephant from the Andamans and Burma.**—*Indian J. vet. Sci.* **5.** 35-48. 8 text figs., 2 figs. on 1 plate. [10 refs.]

This collection of parasites from the Indian elephant was found to contain the following species, a full description being given of three of them :– *Fasciola jacksoni*, *Pfenderius papillatus*, *P. heterocaeca* (full description), *P. birmanicus*, n.sp. (full description), *Pseudodiscus collinsi*, *Murshidia falcifer* and *Syngamus indicus* (full descriptions).—E. L. Taylor.

I. Müller, F. R. (1933). Beitrag zur Kenntnis der Labmagenparasiten des Kamels. [**A Note on the Parasites of the Abomasum of the Camel**].—*S.B. Ges. naturf. Fr. Berl. 1933.* pp. 266-271. 6 figs. on 1 plate. [5 refs.]

II. Enigk, K. (1933). Ein Beitrag zur Parasitenfauna des Kamels (*Camelus bactrianus*). [**The Helminth Parasites of the Camel**].—*Ibid.* 271-280. 5 figs. [44 refs.]

I. In connection with the control of surra a number of camels (*Camelus bactrianus*) were killed in the vicinity of Berlin only three months after their importation into Germany. In the fourth stomach of 14 of these camels a number of nematodes were found, mostly referable to the Trichostrongylidae, the species being *Haemonchus contortus*, *Ostertagia marshalli*, *Trichostrongylus axei* and *T. probolurus*. One member of the Acuaridae was also present, *Parabronema skrjabini*. Notes are given on the morphology of the various species, particularly on *P. skrjabini*.

II. The second paper is an account of further observations on parasites found in the same camels. The following parasites were found :– *Strongyloides papillosus* (more than 100 specimens were recovered from the small intestine of each of two camels)– it is the first time that a member of this genus has been observed in this host ; *Trichuris ovis* – three specimens were found in one camel ; *Cooperia oncophora* and *C. punctata* – eight specimens were found in two camels (members of this genus had not previously been found in the camel) ; *Nematodirus mauritanicus* and *N. helvetianus* – a total of some 80 specimens were recovered from three camels ; *Dictyocaulus viviparus* – representatives of this species were found in 12 of the 14 camels examined ; *Dipetalonema evansi* – 25 specimens were found in the fibrous capsule of the kidneys of one camel. One example of *Stilesia globipunctata* was found in the small intestine, one camel carried *Fasciola hepatica* and all were infected with cysts of *Echinococcus*.—E. L. Taylor.

Bornand. (1935). Contribution à l'étude de la distribution de la distomatose bovine à Fasciola hepatica (L) et de son hôte intermédiaire. [**The Distribution of *F. hepatica* in Cattle and of its Intermediate Host**].—*Schweiz. Arch. Tierheilk.* **77.** 246-255. [8 refs.] [In French].

Bornand has made an enquiry (through the examination of abattoir statistics and by carrying out field observations) into the incidence of *F. hepatica* infestation in Swiss cattle, and of the intermediate host *Galba truncatula* in Switzerland. He found the infestation to be comparatively rare, eggs of fasciola being found only once in the examination of 246 samples of faeces. *G. truncatula* is distributed alike throughout the plains and the mountains, but it is in hollow places in the mountains that it is most frequently found.—E. L. Taylor.

Almarza, N. (1935). Die Leberegel des Schafes. [**The Sheep Liver Flukes (Fasciola, Dicrocoelium, Platynosomum)**].—*Z. InfektKr. Haustiere.* **47.** 195-202. 3 figs. [8 refs.]

Almarza gives a short account of a severe outbreak of liver rot in sheep in a province of Spain. Losses were very heavy, but the most notable observation was the number of species of trematodes that are said to have been involved ; these

included *Fasciola hepatica*, *F. magna*, *F. gigantica*, *Dicrocoelium lanceatum* and three new species of *Platynosomum* which the author calls *Platynosomum* spp. 1, 2 and 3. The record of *F. magna* and *F. gigantica* is the first report of the finding of these flukes in Spain. Short descriptions are given of the three new species, as well as of all the others which are reported to have been found.—E. L. Taylor.

Rao, M. A. N. (1935). **Lung Flukes in Two Dogs in the Madras Presidency.**—*Indian J. vet. Sci.* **5.** 30-32. 3 figs. on 1 plate. [6 refs.]

Rao reports the finding of *Paragonimus westermani* in the lungs of two dogs and of a panther in the Madras Presidency. This is, apparently, the first record of the finding of this fluke in India.—E. L. Taylor.

Økland, F. (1935). Om utbredelse og hyppighet an den lille liverikte (Dicrocoelium lanceatum Stiles & Hassall) i Norge. [**Incidence of *Dicrocoelium lanceatum* Stiles and Hassall in Norway**].—*Norsk VetTidsskr.* **47.** 22-26, 96-100 and 162-166. [4 refs.] [German summary : abst. from orig.]

Although the snail, *Helicella ericetorum* Müll, has been identified by Cameron (1931) and by Matter (1933) as the intermediate host of *D. lanceatum*, this is not the case in Norway, where this snail has never been observed. The intermediate host is, therefore, still unknown. The author made enquiries from a number of local veterinary surgeons and has been able to give some idea of the distribution and incidence of *D. lanceatum* in Norway. A similar survey has already been given by the author regarding *Fasciola hepatica* [this *Bull.* **5.** 357]. From the present survey it will be seen that *D. lanceatum* is found along the coast from the Swedish border in the south and as far north as 70°30′. It is not commonly found in the inland and higher parts but has been reported in the south-east. It is most frequent on the west coast. It is suggested that this incidence is related to the bigger sheep population in the west, or it may be a question of the intermediate host.—Gustav Naerland (Farsund).

Dikmans, G. (1934). **Nasal Granuloma in Cattle.**—*Proc. helminth. Soc. Wash.* **1.** 64.

Attempts to find an animal parasite associated with this condition have failed, but bodies have been found in the nasal mucosa resembling those which occur in rhinosporidiosis.—E. L. Taylor.

Rao, M. A. N., & Ayyar, R. S. (1935). **Ova of Schistosomes in the Faeces of a Dog.**—*Indian J. vet. Sci.* **5.** 23-27. 1 text fig., 2 figs. on 1 plate, 1 table. [11 refs.]

Schistosome eggs from the faeces of a dog were found to resemble those of a species from the pig described by Rao as *Schistosoma suis*. It is considered that the worms from the pig, described by Bhalerao as *S. japonicum*, really belonged to the species *S. suis*. Reasons concerning the morphology of the cercariae and the egg are given, among others, for this conclusion.—E. L. Taylor.

Zünker, M. (1935). Zur Biologie von Menschenbandwurm und Rinderfinne. [**The Biology of the Tapeworms of Man and Bovine Cysticerci**].—*Zlb. Bakt. I. (Ref.).* **117.** 379-384.

This paper, read before the Berlin Microbiological Congress, gives a good account of what is known of the biology of *Taenia saginata*. After a brief historical review the subject is dealt with in three sections :– (1) transference of the egg from man to cattle ; (2) development of the cyst in the intermediate host, and (3) development of the mature worm in man.—E. L. Taylor.

Rao, M. A. N. (1935). **A Note on *Taenia solium* Linneus, 1758 in the Madras Presidency.**—*Indian J. vet. Sci.* **5.** 28-29. [4 refs.]

Reports of the Civil Veterinary Department in Madras showed that pigs from a certain district were infected with *Cysticercus cellulosae* and, as the result of an enquiry, suggested by this report, a case of human infestation with *T. solium* was found. An account is given of previous records of *T. solium* infestation in India.—E. L. Taylor.

Bhalerao, G. D. (1935). **On the Occurrence of *Stilesia vittata* (Cestoda) in Ovines in India.**—*Indian J. vet. Sci.* **5.** 33-34. [9 refs.]

This species had previously been thought to occur only in camels, but Bhalerao here reports having found it on several occasions in sheep and goats in India.—E. L. Taylor.

Africa, C. M., & Garcia, E. Y. (1935). **The Occurrence of Bertiella in Man, Monkey and Dog in the Philippines.**—*Philipp. J. Sci.* **56.** 1-11. 4 plates. [16 refs.]

The authors record and describe the first case of *Bertiella* infestation in the dog. The tenth recorded specimen in man and a specimen from a Philippine monkey are also described.—Gwilym O. Davies.

Lossev, L. (1934). **A Study on the Destruction of Ascaris Eggs by the Surrounding Medium.**—*Med. Parasitol., Moscow.* **3.** 185-191. [In Russian] [Abst. from abst. in *Trop. Dis. Bull.* **32.** 256-257].

A temperature of 50°C. for one hour was not lethal for the unsegmented eggs of *Parascaris equorum*, but most were killed after three hours at 40°C. A temperature of about 60°C. destroyed the eggs in one minute. Eggs containing motile embryos were slightly more resistant. 4 per cent. phenol or quicklime killed the eggs immediately.—J. E.

Mello, A. (1934). Pesquizas em torno da ascaridose suina. [**Ascarids of Swine**]. —*Rev. Indust. anim.* **11.** 17-26. [7 refs.]

A general summary of ascaris infestation of pigs. The author draws attention to the bad hygienic conditions prevailing on many pig farms in Brazil. He states that there is a tendency among pig-breeders to attribute unthriftiness to infestation with ascarids. In the examination of the faeces of over 1,200 pigs, ascarids were found in only 50 per cent. of animals in poor condition. Swine plague and " infectious enteritis " are the most important causes of illness in young pigs.

Ackert, J. E., Eisenbrandt, L. L., Wilmoth, J. H., Glading, B., & Pratt, I. (1935). **Comparative Resistance of Five Breeds of Chickens to the Nematode Ascaridia lineata (Schneider).**—*J. agric. Res.* **50.** 607-624. 1 fig., 4 tables. [34 refs.]

Doses of 50±5 embryonated eggs of *A. lineata* were given to several groups of five different breeds of chickens (totalling 1,351) at ages of 12, 19, 30, 33 and 44 days. After three weeks of parasitism, the chickens were killed and all the worms collected, the criteria adopted for statistical comparison being the number of worms and their lengths. It was found that the heavy breeds were the most resistant and the light breeds the most susceptible. The heavy breeds which were used were Rhode Island Reds, White Plymouth Rocks and Barred Plymouth Rocks, and the light breeds, White Leghorns, Buff Orpingtons and White Minorcas. A strain of heavy White Minorcas proved to be more resistant than a lighter strain of the same

breed of a different genetic constitution. These experiments are believed to give the first evidence of different degrees of host resistance between breeds of the same species to helminthic infection.—E. L. Taylor.

Kauzal, G. (1934). **Observations on the Development of Resistance to Dictyocaulus filaria.**—*Aust. vet. J.* **10.** 100-111. 2 tables, 3 graphs. [6 refs.]

Young lambs under two months old, exposed either to a light infection with a single dose of 200 larvae, to repeated daily doses of 50 to 100 larvae or to 5,000 larvae administered in a small number of consecutive daily doses, frequently developed resistance to and threw off infection, even though lambs occasionally succumbed to acute lungworm disease under similar conditions. Young lambs exposed to infection for the first time may exhibit remarkable variation in individual susceptibility. Lambs five and a half to seven months old exhibited a much higher degree of resistance to first infection than younger animals. Resistance to infection appears to be due in part to age, and to be acquired in part as a result of prior infection. Resistance of lambs was not markedly affected by periods of three and a half to 11 months on a diet so deficient in quality as to lead to cessation of normal growth and even loss in weight. Resistance in animals exposed to reinfection either on deficient or normal diets was not affected by concurrent infection with *Haemonchus contortus*. There is some difficulty in reconciling the extraordinarily high degree of resistance shown in these experiments, in other than very young lambs, with the common occurrence in the field of infection with *D. filaria* in sheep up to 18 months old and even more. It is probable that the experiments did not include all relevant factors operating in the field and which may influence infection either by increasing the susceptibility of the sheep, as for example the effort required to obtain food, or the vitality and infectivity of the larvae.—H. McL. Gordon.

Taylor, E. L. (1935). **Seasonal Fluctuation in the Number of Eggs of Trichostrongylid Worms in the Faeces of Ewes.**—*J. Parasit.* **21.** 175-179. 1 fig. [3 refs.]

Monthly egg counts were made on the faeces of 12 ewes throughout a period of 16 months. The egg output was found to be at a minimum during the winter months, and to rise to a maximum in June, from which it decreased again to the end of the year. The fluctuations do not appear to synchronize with the rise and fall in the intake of infective larvae, and it is suggested that they are referable to seasonal variations in the rate of egg production of the adult worms.

Andrews, J. S. (1934). **Egg Production by *Nematodirus* spp. (Trichostrongylidae) and by *Chabertia ovina* (Strongylidae) following Repeated Experimental Infections of Sheep with these Nematodes.**—*Proc. helminth. Soc. Wash.* **1.** 51.

Infective larvae of *Nematodirus* spp. were given to a young lamb at intervals over a period of one hundred days. Eggs first appeared in the faeces 20 days after the first dose and increased in numbers up to the 54th day, disappearing on the 265th day. Infective larvae of *C. ovina* were given in a similar way and it was observed that eggs first appeared in the faeces on the 52nd day. The maximum count was reached on the 79th day and faecal examinations became negative on the 102nd day.—E. L. Taylor.

Dikmans, G. (1935). **A Note on the Identity of *Cooperia punctata* Ransom, 1907, and *C. fieldingi* Baylis, 1928 (Nematoda: Trichostrongylidae).**—*Proc. helminth. Soc. Wash.* **2.** 84.

Dikmans has made an examination of a number of specimens of *C. punctata* from cattle in Puerto Rico and found the spicules to be of very variable length, ranging almost up to the length of those described by BAYLIS for *C. fieldingi*. The morphology of spicules from these two species being the same, he considers it probable that the species are identical, an opinion which has previously been expressed by LE ROUX.—E. L. TAYLOR.

ANDREWS, J. S. (1935). **A Second Report of the Occurrence of *Trichostrongylus longispicularis* in Cattle in the United States.**—*Proc. helminth. Soc. Wash.* **2.** 90.

A specimen of this species was found in the contents of the abomasum of a cow in Florida. Its measurements corresponded with those given in the description of *T. longispicularis*, but the inconspicuous hook-like projections on the spicules which had originally been described were apparently absent.—E. L. TAYLOR.

CHRISTENSON, R. O. (1935). Remarques sur les différences qui existent entre les oeufs de *Capillaria aerophila* et de *Trichuris vulpis*, parasites du renard. [**Differences between the Eggs of *C. aerophila* and *T. vulpis* from the Fox**]. —*Ann. Parasit. hum. comp.* **13.** 318-321. 3 figs.

The author's examinations of the respective eggs of these two species has led him to the conclusion that measurements given by RILEY (1921) for *T. vulpis* really apply to *C. aerophila* and that the drawing published by RILEY and FITCH (1921) as that of the egg of *T. vulpis* really represents the egg of *C. aerophila*. The eggs may be distinguished by their sizes and by their shells ; the egg of *C. aerophila* measures 59 to 73$\mu$ and has a finely granular shell whereas the egg of *T. vulpis* measures 74 to 90$\mu$ and is relatively smooth.—E. L. TAYLOR.

FOSTER, A. O., & CORT, W. W. (1935). **Further Studies on the Effect of a Generally Deficient Diet upon the Resistance of Dogs to Hookworm Infestation.**—*Amer. J. Hyg.* **21.** 302-318. 4 tables, 3 graphs. [9 refs.]

Twelve dogs ranging in age from seven to 19 months were used in this experiment which was designed to demonstrate the effect of an inadequate diet upon the progress of hookworm infestation, under conditions of repeated dosage. Egg counts were made twice during each week of the experimental period and *post-mortem* examinations were finally carried out to ascertain the severity of the infestations. Seven of the dogs died while on the deficient diet and each showed a terminal breakdown in resistance, characterized by a sharp increase in the daily egg production of the worms during the last two weeks of life. At autopsy they were found to carry between 155 and 614 worms each.

The results clearly indicated that the inadequate diet had brought about a lowered resistance to the invasion and establishment of hookworms, an increased development of the worms, and an increase in the number of eggs produced daily by individual female worms.—E. L. TAYLOR.

WEHR, E. E. (1935). **A Revised Classification of the Nematode Superfamily Filarioidiae.**—*Proc. helminth. Soc. Wash.* **2.** 84-88.

The revised classification which the author here presents is based on the cephalic papillae pattern, the labial structures and the characters of the first stage larvae. Great stress is laid upon the morphology of the microfilariae for the differentiation of the major groups.—E. L. TAYLOR.

DIKMANS, G. (1934). **Observations on Stephanofilariasis in Cattle.**—*Proc. helminth. Soc. Wash.* **1.** 42-43.

*Stephanofilaria stilesi* Chitwood, 1934, is fairly common in South Dakota, Colorado, Wyoming and Nebraska ; it probably also occurs in Montana and in New Mexico. All lesions observed so far have been found on the under surface of the body. Lesions resembling those of stephanofilaria infestation in cattle have been observed in a buffalo.—E. L. Taylor.

Joyeux, C., & Cabassu, J. (1935). Etude sur la filariose des chiens de Camargue. Fréquence de *Dicrofilaria immitis* (Leidy). [*Dirofilaria immitis* **in Dogs in the Camargue, France**].—*Bull. Soc. Path. exot.* **28.** 187-193. 1 fig., 2 tables. [13 refs.]

Microfilariae were found in the blood of 19 out of 26 dogs, and adult worms in the heart of one out of two wild foxes. Old dogs were found to be more frequently parasitized than young ones. Detailed measurements of the microfilariae are given. —E. L. Taylor.

Drinker, C. K., Augustine, D. L., & Leigh, O. C. (1935). **On Filtration of Microfilariae by Lymph Nodes.**—*Trans. R. Soc. trop. Med. Hyg.* **29.** 51-58. 3 figs., 2 tables. [1 ref.]

Experiments were carried out in which the popliteal and iliac lymph nodes of the dog were perfused with a suspension of living microfilariae of *Dirofilaria immitis* in an artificial lymph. It was found that, whereas erythrocytes and streptococci were very efficiently filtered out, the microfilariae managed to pass through quite easily, as had been shown by previous experiments. By analogy it is argued that the microfilariae of *Wuchereria bancrofti* will not be held up in the lymphatics.

It was also shown that the microfilariae of *Loa loa*, although sheathed, are more motile than the unsheathed microfilariae of *D. immitis*.—E. L. Taylor.

Cram, Eloise B. (1934). **Recent Records of the Gizzard Worm,** *Acuaria anthuris* **(Rudolphi, 1819) (Nematoda : Acuariidae), with Observations on its Life History.**—*Proc. helminth. Soc. Wash.* **1.** 48-49. 1 fig.

It has already been shown that *A. ornata* (Gendre, 1912) is a synonym of *A. anthuris* [a gizzard worm of American crows which has been shown to be capable of infecting chickens], and it is probable that *A. nebraskensis* should also be included in that species. Life-history experiments carried out by the author showed that the larvae develop in grasshoppers (*Melanoplus femurrubrum*) and in crickets. The larva which is described appears to be fully developed in 28 to 30 days.—E. L. Taylor.

## IMMUNITY.

Birkhaug, K. E. (1935). Allergie tuberculinique et résistance à une surinfection virulente chez les cobayes inoculés *per os* avec les variétés R et S du BCG. [**The Tuberculin Response and Resistance to Infection of Guinea Pigs Receiving the S and R Forms of BCG by the Mouth**].—*C. R. Soc. Biol. Paris.* **119.** 472-474. [1 ref.]

Two groups of 12 guinea pigs received 300 mg. of the S and R forms of BCG respectively by the mouth. They were tuberculin tested at regular intervals and at the 96th day they were tested for immunity by the intraperitoneal inoculation of a virulent strain. The results tended to show that the S form produced better results by inducing stronger and more lasting tuberculin responses and a relatively marked resistance against infection. The average periods of survival were 98 days for the controls, 104 days for the R immune and 242 days for the S immune animals. —R. E. Glover.

—. (1935). Tuberculinatic van zilvervossen. [**Tuberculin Testing of Silver Foxes**].—*Tijdschr. Diergeneesk.* **62.** 313-314. [1 ref.] [English, French and German summaries : abst. from orig.]

The thermal reaction after subcutaneous injection of tuberculin into silver foxes is not reliable because the normal body temperature shows considerable fluctuations (in two foxes 37° to 38°, in 32 foxes 38° to 39°, in 63 foxes 39° to 40° and in 17 foxes 40° to 41°C.).—J. VAN DER HOEDEN (UTRECHT).

BELLER, K. (1934). Zur Antigenfrage beim serologischen Tuberkulosenachweis. [**Antigen for Serological Diagnosis of Tuberculosis**].—*Berl. tierärztl. Wschr.* **50.** 129-132. 5 tables. [13 refs.]

Formic acid and acetone, with or without the addition of lecithin, were used as synthetic antigens, and were compared with tuberculin to test their value as antigens in the complement-fixation test. Though there was considerable disagreement in the results recorded by these antigens and tuberculin, in no instance did the synthetic antigen record a negative result with a sample of serum which gave a positive reaction when tuberculin was used.

Bovines giving negative reactions to the tuberculin test were injected three times subcutaneously with various types of tuberculin and the resulting antibody reactions of their sera were noted. These tuberculin preparations produced little rise in antibody content, and formic acid antigen gave the best results in the complement-fixation test. In a further experiment in which animals received heavy injections of tuberculin, the resulting antibody reaction was obtainable within four days of the injection when tuberculin was used as antigen in the complement-fixation test. Synthetic antigens revealed the reaction several days later.—E. J. P.

CATTANEO, F. (1935). Rilievi e considerazioni sul comportamento del sangue di pecora nella prova dell'agglutinazione per la diagnosi della brucellosi. [**Blood Agglutination Test for Brucella Infection in Sheep**].—*Nuovo Ercol.* **40.** 67-73. 2 tables. [11 refs.]

Agglutination tests were carried out on blood samples from nine sheep known to be suffering from *Br. melitensis* infection. All the samples were positive at the first test ; 15 days later, however, only four positive results were obtained although there was no reason to suppose that the animals which gave negative results were not still harbouring the organisms. It has been suggested that starvation may cause a variation in the agglutination titre, but no variations were found in the agglutination titres of sera from 13 sheep when they were tested immediately after a meal and after 12 hours' starvation. Cattaneo concludes that the agglutination test is not absolutely reliable for the diagnosis of brucella infection in sheep and that it should be combined with the allergic test of DUBOIS. [The author has not provided evidence to support this statement].—J. A. NICHOLSON.

VICHELESSKY, S. N., & BOBILEVA, E. A. (1935). **Diagnosis of Brucella Infection in the Horse.**—*Sovyet. Vet.* No. 1. pp. 43-48. [In Russian : abst. from French summary].

The authors point out that in the horse slight exhibitions of lameness, articular inflammations and suppurative lesions of the withers and poll, sometimes accompanied by general fever, are suggestive of brucella infection. The most certain method of isolating the causal agent in such cases is by inoculation of guinea pigs with material from the lesions. They failed to isolate the organism by cultural methods, except in one case where urine was employed and in another where the seed material was obtained from a healing wound. The latter gave a pure culture of the organism.

Employment of abortin in diagnosis yielded 30 per cent. more positive reactions than the agglutination test, 40 horses in all being tested. Of these only one gave a positive reading to the agglutination test and a negative one to abortin. The authors consider abortin to be a specific diagnostic agent in this condition with a single objection, namely that, when employed, agglutinins remain present in the blood for some time.—C. Davenport.

Franco, E., & Pezzi, R. (1935). Contribution expérimentale à l'étude d'une réaction allergique pour le diagnostic de la brucellose chez les bovidés. [**The Allergic Reaction in the Diagnosis of Bovine Brucellosis**].—*Boll. Sez. ital. Soc. int. Microbiol.* **7.** 58-66. 2 tables. [17 refs.] [In French].

Franco and Pezzi have compared the results obtained by intradermal injection of abortin, prepared according to the method of Dubois, with those of serum and whey agglutination tests. The comparison was made on 64 cows and eight bulls. Definite local reactions from the size of a small nut to that of an egg were obtained at 12 to 24 hours, accompanied by a variable but not serious degree of general reaction. The results agreed closely with those obtained by serum agglutination and the authors, although " not wishing to attribute to it the value of serum agglutination " conclude that, on account of the ease with which it can be applied and read, it should not be " overlooked " in country practice. Of 59 animals whose sera agglutinated *Br. abortus* at 1 : 160 to 1 : 40, 57 gave intradermal reactions recorded as positive and 12 doubtful results ; of six at 1 : 20, three gave a positive skin reaction, one a doubtful result and one a negative ; of seven at 1 : 10, five gave a negative skin result whilst two were doubtful. In a few cases calves reacted a few days after birth.—A. W. Stableforth.

Lubbehusen, R. E., & Beach, J. R. (1935). **The Place of the Whole-Blood Test in a Pullorum Disease-Eradication Program.**—*J. Amer. vet. med. Ass.* **86.** 620-634. 6 tables. [2 refs.]

The whole-blood stained antigen test is not sufficiently reliable to be used exclusively in the programme of a pullorum disease eradication scheme. By retesting with the whole-blood method at short intervals, the number of affected birds in a flock may be quickly reduced to 1 per cent. or less, and the flock in this way may be prepared for the test with the more highly efficient tube method.

Official recognition of the whole blood method should be reserved until it has been improved to the point that its efficiency is equal to that of the tube test.—Norman Dobson.

Jacotot, H., & Tran-Ngoc-Hoan. (1935). Essais de diagnostic de la peste bovine par injection intradermique d'antigène. [**The Value of the Intradermal Injection of (Rinderpest) Antigen in the Diagnosis of Rinderpest**].—*Bull. Soc. Path. exot.* **28.** 252-255. [2 refs.]

The value of intradermal injections of formolized emulsion of spleen pulp, gland and lung from rinderpest-infected animals, as a means of diagnosis, was tested by the inoculation of animals in the incubation period, recently affected animals and immune animals. No reaction could be detected, nor did a mixture of virulent blood and castor oil, which had been reported as valuable in the diagnosis of swine fever [this *Bull.* **4.** 728.] give any specific reaction on intradermal injection into cattle or swine infected with rinderpest.—U. F. Richardson.

de Megni, N. (1935). Recherches sur l'agglutination aspécifique par les substances colorantes appartenant au groupe de l'acridine. [**Non-Specific**

**Agglutination by Acridine Dyes**].—*Boll. Sez. ital. Soc. int. Microbiol.* **7.** 54-58. [In French].

de Megni shows that, like " trypaflavine ", the other acridine derivatives, crysaniline and acridine orange, have the power of flocculating the R forms of bacteria of the typhoid, *coli* and dysentery groups, but have no effect on the S forms (acridine-agglutination). Acridine red sometimes shows a bacteriolytic action. The optimum concentration for agglutination was about 1 : 500, sometimes 1 : 1,000, but agglutination occurs between 1 : 250 and 1 : 2,000. Although the factors concerned are complex, it is thought probable that the agglutinating action of the compounds is due to their amino groups.—A. W. Stableforth.

McMaster, P. D., & Hudack, S. S. (1935). **The Formation of Agglutinins within Lymph Nodes.**—*J. exp. Med.* **61.** 783-805. 8 tables. [46 refs.]

The authors have endeavoured to demonstrate that antibodies are formed in lymph nodes. As antigen, members of the *Salmonella* genus and *Chromobact. prodigiosum* were used. Antigen was inoculated intradermally into the ears of mice, it having previously been ascertained by means of dye injections that the bulk of such an inoculum would be carried direct to certain cervical lymphatic glands. At suitable intervals glands were excised, extracted in saline and the extract tested for antibody content. Blood serum was similarly tested. Precautions taken to avoid non-specific agglutination of antigen included avoidance, when possible, of the use of only slightly diluted tissue extracts, by the use of microscopic agglutination technique and the Gates centrifugation technique, all tests being carried out at room temperature. Mice were not examined singly, but blood and glands of several animals were pooled to obtain sufficient material for tests. It was found that (1) if one ear was injected agglutinins could be demonstrated in the corresponding lymph gland before they appeared in the gland on the opposite (uninjected) side ; (2) after such injection, agglutinins appeared more rapidly and to a higher titre in the corresponding gland than in the blood : after about 12 days had elapsed the difference of titre disappeared ; and (3) when one ear was injected with *S. enteriditis* and the other with *Chromobact. prodigiosum* the corresponding lymphatic glands each showed a higher concentration of agglutinins against the organism which had been injected on that particular side.

These experiments demonstrate that antibodies are formed in lymphatic glands and they throw light upon the defence mechanism of the animal body to injection. It is emphasized that there is every reason to believe that antibodies are formed in other tissues besides these glands.—E. J. Pullinger.

Andrews, Mary N. (1935). **The Complement Fixation Reaction in *Schistosoma japonicum* with Cercarial Antigen prepared from *Oncomelania hupensis*.**—*J. Helminth.* **13.** 25-40. 2 tables. [19 refs.]

The preparation is described of cercarial antigen by alcoholic extraction, following Fairley's technique, of infested livers of *O. hupensis*, intermediate host in China of *S. japonicum*. Antigens prepared from adult schistosomes were also used, the results obtained with both corresponding fairly closely. Further work is proceeding.

Forty-nine human sera were examined, 37 from cases of schistosomiasis. Twenty-four of these were positive, two weakly so, and 13 were negative. Negative reactions do not, therefore, exclude schistosome infection, but many of these were from old cases or were tested only once. Twelve non-schistosome cases, including two infested with *Fasciolopsis buski*, two with *Clonorchis sinensis* and some with ascaris and hookworm all gave negative reactions. Fifty strongly positive Wasser-

mann sera were all negative, so that cercarial antigen is specific for *S. japonicum*. Three dogs infected with schistosoma were all positive; two not infested were negative.

Bilharzian antigen was used in 33 cases, 25 of which were schistosomiasis, and 19 reactions were positive. Oncomelanian antigen was used in 40 cases, 32 of which were schistosomiasis, 23 giving positive and three weakly positive reactions.

—G. LAPAGE.

—. (1934). **Physico-Chemical Basis of Antigen-Antibody Reaction.**—*Brit. med. J.* March 3rd. 385-386. [4 refs.]

This is a leading article on the subject of MARRACK's monograph [see this *Bull.* **5.** 568]. It is mainly a historical introduction to the subject matter of the monograph, showing the tremendous advances made since OBERMAYER and VICK offered their contribution to the study of antigen-antibody reaction at the beginning of the present century.—JAMES STEWART.

CULBERTSON, J. T., & KENT, J. F. (1935). **The Relationship of Circulating Antibody to the Local Inflammatory Reaction to Antigen (the Arthus Phenomenon).**—*J. Immunol.* **29.** 29-39. 3 tables. [24 refs.]

A series of rabbits were sensitized to crystallized egg albumen, and the presence of serum precipitin in the blood of these animals was estimated by the " neutralization " method (Culbertson). When the animals were injected intracutaneously with 0·1 c.c. of a solution of crystallized egg albumen, there was a direct correlation between the severity of the local inflammatory (Arthus) response and the serum precipitin titre. The removal of the circulating antibodies from a rabbit by the intravenous injection of antigen rendered the animal incapable of giving the reaction. It was also found that it was possible to sensitize passively a normal animal to the test. The authors conclude that the tissue hypersensitiveness in an actively sensitized animal is dependent upon the formation of antibody, and that the tissue sensitizing substance in an antiserum appears to be inseparable from, and probably identical with, the precipitin.—F. BLAKEMORE.

SÉZARY, A., & MAURIC, G. (1935). Hypersensibilité, intolérance, idiosyncrasie, anaphylaxie, allergie. [**Hypersensitivity, Intolerance, Idiosyncrasy, Anaphylaxis and Allergy**].—*Rev. Immunol.* **1.** 177-185. 1 table. [14 refs.]

The authors state that it is difficult to distinguish between the various forms of intolerance by the clinical symptoms presented, but that it is possible to classify them according to the reactions given to cutaneous tests. The types of lesions observed in these tests are described, and an account is given of their pathological significance.—F. BLAKEMORE.

PAGEL, W. (1935). **The Production of Koch's Phenomenon with Various Strains of Tubercle Bacilli.**—*J. Path. Bact.* **41.** 89-96. 4 figs. [11 refs.]

Various strains of *Mycobact. tuberculosis* were examined in relation to Koch's phenomenon, special attention being paid to dissociated forms. In animals affected with a virulent strain, i.e. showing advancing tuberculosis, the R types produced the immediate necrosis typical of Koch's reaction, whereas the S types usually failed to do so. In animals inoculated with avirulent strains, or in those infected with virulent strains before the stage of generalization, certain S forms (BCG and human strain Ratti) induced a small but definite response. Non-pathogenic acid-fast bacilli and killed tubercle bacilli were incapable of producing hypersensitiveness when injected in doses equal to those of living virulent strains.

—R. E. GLOVER.

Ramon, G., & Lemétayer, E. (1935). Sur une méthode de production rapide et intensive de l'immunité et de l'antitoxine tétanique chez les animaux : son intérêt pratique et théorique. [**A Method for the Rapid Production of Immunity and Tetanus Antitoxin in Animals**].—*C. R. Soc. Biol. Paris.* **119.** 248-252. [7 refs.]

The authors tested a method for the rapid production of immunity and antitoxin upon five sheep and two horses, following its successful application upon laboratory animals. A combination of either anatoxin or toxin with lanolin in increasing doses was used with a technique of multiple subcutaneous injections. The method appeared safe even with the toxin-lanolin mixture, but one trial upon a sheep in which a toxin-lanolin-oil mixture was used produced slight tetanic intoxication. Compared with the former method of injection of anatoxin alone, the production of antitoxin was both quicker and upwards of some thousand times greater in both the sheep and horses. Further investigations are now being carried out and the authors hope to explain in a later paper the process of toleration of comparatively large doses of toxin when administered in this way.—C. V. W.

Wadsworth, A., Crowe, M. O'L., & Smith, L. A. (1935). **The Spectroscopic Investigation of Bacterial Toxins : the Absorption Spectra of the Products of** *C. diphtheriae.*—*Brit. J. exp. Path.* **16.** 201-217. 10 figs. [16 refs.]

The authors' investigations show that toxic and non-toxic filtrates of *Corynebact. diphtheriae* can be differentiated by means of their spectra. In the case of toxic filtrates definite bands are evident in the visible regions of the spectrum and inflections in the ultra-violet region. These are either faint or absent in toxic filtrates of low potency.

The absorbing ingredients appear to be distinct from the toxins as they may be removed from the toxin, in part by ultrafiltration, or wholly by adsorption on charcoal.—Gwilym O. Davies.

Aoki, Y. (1935). Zur Antigenfunktion fraktionierter Tuberkelbazillenbestandteile. [**Antigenic Function of Fractions of the Tubercle Bacillus**].—*Jap. J. exp. Med.* **13.** 261-274. 8 tables. [22 refs.] [In German].

The tubercle bacillus is considered to consist of two antigenic fractions, the E-fraction which incorporates polysaccharides and defatted bacilli and an F-fraction containing phosphatide, fat and wax components. The serological relationship between these components has been worked out. [No attempt has been made to correlate this work with the pioneer work of Sabin and her co-investigators on the various chemical fractions of the tubercle bacillus].—E. J. Pullinger.

Wadsworth, A., Hyman, L. W., & Nichols, R. R. (1935). **The Lipid Content of Livers of Non-Immunized and Immunized Horses.**—*Amer. J. Path.* **11.** 419-427. 9 figs. on 3 plates, 2 tables. [13 refs.]

Prolonged or intensive immunization of horses for the production of therapeutic serum is often complicated by fatty degeneration of the liver and, in order to examine this, the authors made a chemical and histological study of the tissue changes and of the degenerative processes in this organ. Livers were obtained from eight non-immunized and 41 immunized horses ; the immunized animals included 11 tetanus, 6 diphtheria, 1 botulinus, 7 meningococcus, 12 pneumococcus and 4 streptococcus horses ; and the total fatty acids and iodine values, phospholipins, free cholesterol, esterified cholesterol and neutral fat of the livers were estimated. The percentage of the total fatty acids in the non-immunized horses varied but little ; in the immunized horses the variation was quite pronounced.

The iodine values indicated a uniform degree of unsaturation. The amount of phospholipins of the non-immunized horses varied only slightly, while that of the immunized horses showed appreciable differences in percentage and, with few exceptions, was uniformly low. The free cholesterol values of the non-immunized horses were similar ; with the immunized horses the range was greater. The esterified cholesterol was a low value with most of the horses. The neutral fats in the non-immunized horses were uniform in amount ; with the immunized horses the range was much greater. The degenerative changes which developed in the liver as a result of immunization are described.—James Stewart.

Guillot, G., & François, P. (1935). Influence du sérum antigourmeux sur la culture du streptocoque gourmeux. [**The Influence of Strangles Antiserum on Cultures of** *Streptococcus equi*].—*Rec. Méd. vét.* **111.** 269-273. [5 refs.]

Guillot and François find that, in most cases, *Str. equi* grows better in broth to which *Str. equi* antiserum has been added than in broth made with normal serum. No relation exists between the complement-fixing power of the serum and its growth-promoting power. The effect was most notable on the strain used to produce the serum, somewhat less on other strains of *Str. equi* and markedly less on other streptococci of equine origin.—A. W. Stableforth.

Donatien, A., & Lestoquard, F. (1935). La prémunition et les vaccinations prémunitives dans la pathologie vétérinaire. [**Premunition and Premunizing Vaccinations in Veterinary Pathology**].—*Bull. Acad. vét. Fr.* **8.** 125-131. [3 refs.]

This article discusses the methods of conferring premunity, or the resistance to further infection due to an existent latent infection. Such resistance can be conferred without provoking serious disease by the use of organisms which have been attenuated, and this principle is adopted in the use of BCG vaccine for tuberculosis, the use of piroplasms from resistant animals, and the use of blood, taken during the incubation period, to produce mild attacks of anaplasmosis. Attempts to confer premunity by using avirulent strains of anaplasms have not been very successful, but a mild strain of *Theileria dispar* has been used for vaccination against theileriasis in North Africa. Attempts have been made, by provoking local lesions to which the organisms are confined, to protect against tuberculosis and Johne's disease, whilst in piroplasmosis and trypanosomiasis premunity has been established by the control of the infection with drugs given in doses insufficient to produce a sterilizing cure.—U. F. Richardson.

—. (1934). Rapport sur l'emploi de l'antivirus strepto-staphylococcique dans l'armée. [**Report on the Use of Strepto-Staphylococcal Antivirus in the French Army**].—*Rev. vét. milit.* **18.** 469-483.

This is a preliminary report on the results obtained by the veterinary service of the French army in the use of a strepto-staphylococcal " antivirus " prepared and issued by the military veterinary laboratory. The " antivirus " was applied direct to suppurating sinuses and fistulae. The results obtained with its use in 21 cases are given in detail.—C. Davenport.

Fourie, P. J. J. (1935). **Blood Groups of the Horse with Special Reference to their Significance in Blood Transfusion and in Horsesickness Immunisation.** —*Onderstepoort J. vet. Sci.* **4.** 7-47. 8 figs., 5 tables. [54 refs.]

The blood groups of 47 horses were determined. It was found that the best preservative for the blood corpuscles used in the experiments was " superol "

(" chinosol "). The figures for South African horses appeared to correspond closely to those of BURGHARDT, i.e., group O, 6 per cent. and group AB, 50 per cent. Figures for A and B could not be given.

The paper is mainly devoted to a discussion and to experimental work on the production of shock during the immunization of horses. The " J " organism of Friedenreich was isolated from equine blood cell emulsions. The organism causes red cells to be agglutinated by the serum of the animal from which they were obtained, or any other serum. Red cells transformed by the " J " bacillus cause severe shock when inoculated intravenously into the animal from which they came. A solution of haemoglobin in a comparatively small dose produced fatal shock when injected intravenously into an incompatible receiver. In one case severe shock occurred when blood was transfused from a donor having group relationships of the human universal donor. In only a portion of cases is severe haemolytic shock induced when large quantities of whole blood are transfused from donors with incompatible red cells.—E. M. ROBINSON.

## DISEASES, GENERAL.

KARSTEN. (1935). Ueber die Schaffung seuchenfreier Rinderbestände. [**The Production of Disease-Free Herds**].—*Dtsch. tierärztl. Wschr.* **43.** 55-61. [2 refs.]

Karsten gives his views on the way in which the useful, but difficult and prolonged, task of creating herds of cattle which are free from the wide-spread chronic diseases, abortion, mastitis and tuberculosis, can be begun, and the mistakes to avoid. He stresses the fact that, in chronic diseases such as these, auxiliary factors, viz. milk yield, housing and feeding, are of much greater importance than in acute disease. In dealing with them the first step should be the protection of herds which are already free from one or other of these diseases, and their official naming as such, due attention being given to the conditions under which the cattle are kept and the probability of the herds remaining free. He discusses some of the difficulties encountered – the animal whose blood serum and whey are free from *abortus* agglutinins but which aborts, or in whose milk *Br. abortus* is found, the difficulty of being sure that a quarter does not carry *Streptococcus agalactiae*, the fact that, in a herd of which none reacts to tuberculin, an open case may suddenly be found, and the fact that tuberculosis often causes no obvious loss to the owner, etc.—A. W. STABLEFORTH.

DEBELIĆ, S. (1935). Statistika zaraznih bolesti u Jugoslaviji. [**Animal Diseases in Yugoslavia, 1924 to 1928**].—*Vet. Arhiv.* **5.** 241-246. 1 table. [Abst. from German summary].

A summary of fortnightly records of animal diseases between 1924 and 1928. Swine fever was the most important disease and anthrax second in importance. Rabies remained localized in certain areas and showed little tendency to spread. Sheep pox and swine erysipelas were common. Blackleg was present in about half the Government districts. Foot and mouth disease broke out in 1924, and was gradually brought under control until it was eradicated in 1928. Dourine was present in a few districts.—J. E.

SCHÜRMANN, E. (1934). Die wirtschaftlich-wichtigen Erkrankungen der Hühnerkücken in Lichte deutscher und ausländischer Forschung. [**The Important Diseases of Fowls in the Light of Recent Research**].—*Arch. Geflügelk.* **8.**

209-233, 293-298 and 325-345. 2 tables. [English summary : abst from orig.]

The diseases of fowls which, in the opinion of the author, are of primary importance to the poultry industry of Germany are discussed. Each disease comes under a separate heading, whilst under sub-headings various subjects such as aetiology, method of infection and symptomatology are discussed. As a result, the publication takes the form of a miniature text-book. No original experiments are recorded but copious references are made to the literature. Unfortunately the bibliography appears to have been omitted, which detracts considerably from the value of the article.

The diseases considered are *Salmonella pullorum* infection, coccidiosis, aspergillosis, infestation with *Syngamus trachealis*, non-specific enteritis, lameness of a rickets type and lameness of the fowl paralysis type. The author considers that research upon fowl diseases should be designed to study the factors which render birds susceptible to diseases instead of following up strictly academic problems.—E. J. PULLINGER.

GRIEDER, H. (1935). Unsere während drei Jahren gemachten Beobachtungen und Erfahrungen über Nutriakrankheiten. [**Three Years' Work on the Diseases of Nutria**].—*Schweiz. Arch. Tierheilk.* **77.** 255-265. 5 figs. [24 refs.]

Records have been kept of the probable causes of death of 811 nutria. Parasitic worms present the most serious problem, *Strongyloides papillosus* and *Trichostrongylus* sp. being the most troublesome parasites. About 500 nutria showed helminthic infestation. Coccidiosis was also a common infection and was frequently combined with helminthiasis. Bacterial causes were unimportant, accounting for only 27 deaths, *Corynebacterium pseudotuberculosis ovis*, a pneumococcus and *Salmonella typhi-murium* being the organisms incriminated in their order of importance. Of non-infectious and non-contagious disorders, gastro-enteritis following improper feeding, infections of the urogenital tract and wounds were of moderate importance. —E. J. PULLINGER.

I. FENSTERMACHER, R. (1934). **Further Studies of Diseases Affecting Moose.** —*Bull. Minn. agric. Exp. Sta.* No. 308. pp. 26. 3 figs., 2 tables. [14 refs.]

II. FENSTERMACHER, R. (1934). **Diseases affecting Moose.**—*Vet. Alum. Quart.* **22.** 81-94. 3 figs., 1 table.

Paper I is a further report on seven new cases of moose disease examined since the time of publication of Bulletin No. 294 of the Minnesota Station [this *Bull.* **4.** 479.], and II is a concise account of all the work covered by Bulletins Nos. 294 and 308.

In spite of detailed examinations of sick animals before and after death, the cause of the disease or diseases was not discovered, bacteriological and tick transmission work yielding negative results.

These records will, however, be of considerable value to any workers studying diseases of moose in the future.—J. E.

RINJARD, P. (1935). Contribution à l'étude expérimentale du coryza gangréneux. [**Experimental Study of Malignant Bovine Catarrh**].—*Rec. Méd. vét.* **111.** 335-356. 1 table, 8 graphs. [20 refs.]

The author presents the results of his work on the experimental transmission of malignant catarrh from affected to healthy cattle. Between 1930 and 1934, five natural cases were used to attempt to infect 12 animals by the direct inoculation,

intravenously or subcutaneously, of defibrinated or citrated blood, filtered conjunctival discharge or filtered nasal discharge. The results were positive in six cases, in all of which blood had been used.

Attempts to pass on the disease from two of these artificially produced cases to two further animals were unsuccessful.

The literature is reviewed and the aetiology discussed at some length.—J. E.

ALEKSA. (1935). Le coryza gangréneux en Lithuanie. [**Malignant Bovine Catarrh in Lithuania**].—*Rec. Méd. vét.* **111.** 274-278. 1 table.

The author reports on 159 cases of malignant bovine catarrh in Lithuania between 1930 and 1934. Of these, 135 cases were sporadic, only single animals in a herd being affected. There was a history of contact with sheep in 120 cases and of no such contact in 39 cases. This observation supports GOETZE's theory [this *Bull.* **1.** 90.] but also suggests an undiscovered alternative mode of transmission. Forty-two of the above cases were animals in good condition at the time of onset and 100 were in poor condition.

Attempts to transmit the disease to rabbits gave inconclusive results, the author considering that they are not susceptible. No success has been obtained by drug treatment. It is suggested that the best way to avoid losses is to prevent contact between sheep and cattle.—J. E.

KNABE. (1934). Ueber den Russ der Ferkel (Pechräude). [**" Rust " (Skin Disease) of Pigs**].—*Tierärztl. Rdsch.* **40.** 844.

" Rust ", a form of eczema in which black crusts are formed on the skin, is a disease of suckling pigs occurring chiefly in summer or autumn. The sow may also be affected and show black crusts on the udder. Knabe saw one sow entirely covered with them. The cause is unknown.

The author says that the condition may be cured by protein shock therapy. —J. E.

ROSS, I. C. (1934). **Tick Paralysis in the Dog. Period Elapsing between Attachment of Tick and the Onset of Symptoms.**—*Aust. vet. J.* **10.** 182-183.

Experimental observations on over 100 dogs indicate that the first symptoms of paralysis do not occur earlier than the fourth and usually on the fifth day after the attachment of the adult female tick. The shortest period, early on the fourth day, was observed when 31 ticks were allowed to engorge on a puppy weighing about 6·5 lb. Among lay dog owners, the idea is prevalent that paralysis may supervene after a few hours' attachment. This idea is apparently due to ignorance of many dog owners of the gradual process of engorgement of the tick, of the true identity of partially gorged and engorged ticks, which are often considered as different species, and also to their belief in the infallibility of the methods adopted by them for the removal of ticks.—H. MCL. GORDON.

HOPKIRK, C. S. M. (1935). **Staggers in Live-Stock.**—*N.Z.J. Agric.* **51.** 18-21.

The article deals principally with three forms of staggers seen in stock in New Zealand, rye-grass staggers, *Paspalum* staggers and grass tetany.

The first two conditions are thought circumstantially, but without sufficient experimental proof, to be due to ergot infection of the grass with subsequent ingestion by stock. *Paspalum* staggers was seen for the first time in New Zealand in the autumn of 1935 coincident with a general flush of *Paspalum* with ergot infection of quickly growing seed heads. Ergot had not been previously observed to the same extent. Staggers on rye-grass pasture is seen only at the end of dry

seasons when the stock are biting very close to the ground. Usually ergot sclerotia can be found at the grass roots.

Grass tetany, which occurs in the spring, is associated in New Zealand with high phosphate top-dressing, and low calcium and magnesium in winter pastures.

The treatment of grass tetany consists of injecting magnesium sulphate subcutaneously. The use of dolomite or magnesium sulphate in ensilage, or magnesium sulphate in drinking water, is being tried prophylactically.

STEFFAN, H. (1935). Das Herz bei inneren Erkrankungen des Pferdes. III. Mitteilung. Elektro- und phonokardiographische Untersuchungen bei Rotlaufserumpferden. [**The Heart in Diseases of the Horse. III. Electro- and Phonocardiographic Investigations on Horses Producing Swine Erysipelas Serum**].—*Arch. wiss. prakt. Tierheilk.* **69.** 175-204. 6 text figs., 2 tables. [6 refs.]

Records of the graphs taken from 28 horses used for the preparation of swine erysipelas serum are noted. The ages of these animals ranged from four to 25 years, but the majority were over 15 years of age. The following features were characteristic of the hearts of horses used for serum production :– there was marked interference with auricular action and a lag in the passage of stimuli from the auricle to the ventricle ; the heart muscle, coronary vessels and heart valves showed degenerative changes. The above abnormalities all result from the action of a toxic product of the inoculum. The heart action of serum-producing horses can be improved, not only by heart stimulants such as digitalis, but also by the injection of tissue extracts of heart or skeletal muscle.—E. J. PULLINGER.

MANDON, A. (1935). La jaagziekte de l'Afrique du Sud. [**" Jaagziekte " in South Africa**].—*Rec. Méd. vét. exot.* **8.** 25-32. [15 refs.]

This article contains no new facts, but the current knowledge of the disease of sheep known as " jaagziekte " is reviewed.

" Jaagziekte " derives its name from the fact that sheep, which appear to be healthy, may suddenly collapse when driven fast. On *post-mortem* examination they show lesions which characterize this disease. The outstanding feature of the condition is a pulmonary consolidation which is best studied in its very early stages. The earliest lesions consist of foci of proliferation of the epithelial cells lining the pulmonary alveoli. As the condition advances these foci take on the appearance of epitheliomata. Another school of thought, headed by COWDRY, considers that the primary lesion is to be found, not in the epithelial lining of the alveoli, but in the interstice of the alveolar wall. The observations of DE KOCK on the one hand, and COWDRY and MARSH on the other, of the sequence of the histopathological changes are recorded and their respective interpretations of the significance of these changes are noted.

" Jaagziekte " occurs in certain well-defined areas of South Africa, where it appears sporadically, producing a low and fairly constant annual mortality of 1·6 per cent. The aetiology of the disease is unknown and no convincing evidence regarding its infectivity has been forthcoming.—E. J. PULLINGER.

BRÜNING, H. J. (1934). Ein Beitrag zur Kenntnis der Steingallen mit besonderer Berücksichtigung der pathologischen Histologie. [**Pathology of Corns in Horses**].—*Inaug. Diss. Berlin.* pp. 22. 1 fig. [38 refs.]

The author classifies corns according to their nature as (a) dry or acute ; (b) chronic, and (c) suppurating. In the present paper he deals with the acute form and gives a review of the literature. About 1·6 per cent. of sick and lame

horses suffer from corns. The best method of studying the histology of normal and diseased horny and sensitive structures is to place small blocks of these tissues in 10 per cent. formalin solution for 24 hours and to cut the sections with a freezing microtome. Sections are stained in haematoxylin for ten minutes, washed in water, differentiated in acid alcohol and then stained in alcoholic eosin for four to five minutes.

The most important histological changes in corn are summarized as follows :– (1) the horny laminae show marked twisting and bending ; there are differences in their thickness and length, and they are poorly supplied with horn ; (2) the primary and secondary sensitive laminae are irregularly placed and show considerable difference in form and size : they do not run parallel ; twisting, contraction and division are frequent ; in parts there is atrophy of the secondary sensitive laminae and an increase in epithelial cell formation ; (3) there is blood and lymph stasis and extensive haemorrhage into the stratum papillare, together with hyperaemia and haemorrhage of the stratum vasculosum, and (4) inflammatory changes in the form of exudation of lymphocytes, plasma cells and occasional polymorphonuclear leucocytes, with extensive fibroblast formation in the stratum vasculosum, are features of the condition.

Clinically, corn is a disease of the streets. Different forms of shoeing are discussed, together with the case records of ten typical cases. The chief means of treatment are foot hygiene, suitable shoeing and operative measures, all of which appear to follow British usage apart from continental modifications.—A. W. N. P.

Henkels, P. (1935). Kampf dem Hufkrebs. (Ueber Aetiologie und Prophylaxe des Hufkrebses der Pferde). [**Aetiology and Prophylaxis of Canker of the Foot in the Horse**].—*Dtsch. tierärztl. Wschr.* **43.** 180-186. 12 figs. [1 ref.]

The author presents the results of his researches into the cause of canker of the hoof in horses and, as a result of histological work combined with tests on the action of urine, etc., on the horn of the frog and sole, he concludes that the chief cause of the condition is the penetration of chemical matter (the product of the animal's own excreta) into and through the horn, particularly at the groove between frog and sole, with the result that the horn itself becomes underrun and separated from the matrix.

The conditions in which canker occurs agree entirely with this theory and preventive measures based upon it are efficacious.

The preservation of the frog and the avoidance of over-paring are important, coupled with properly maintained standings.—J. E.

Beveridge, W. I. B. (1934). **Foot-Rot in Sheep. Skin Penetration by Strongyloides Larvae as a Predisposing Factor.**—*Aust. vet. J.* **10.** 43-51. 2 figs. [10 refs.]

The epidemiology of foot-rot indicates that contagion does not produce the disease under all conditions and, in the controls to the experiments detailed, mere application of necrotic material from cases of foot-rot did not produce the disease. Some predisposing factor or factors appear to be necessary. The commonly advanced theory that prolonged wetting of the feet predisposes has not always been supported by observation and experiment. It is suggested that percutaneous infection with larvae of *Strongyloides papillosus* may provide a portal of entry for the causal organism and that this may be a common way in which the disease is set up in the field. Evidence is given suggesting that conditions which have been observed to produce the highest incidence of foot-rot are also those which would be conducive to the heaviest percutaneous infection of the sheep's feet with this

nematode. Experiments demonstrated that it is possible to produce the disease by application of *S. papillosus* larvae and infective material. It is also suggested that percutaneous infection with this nematode may provide a portal of entry for bacteria causing other diseases of sheep.—H. McL. Gordon.

László, F. (1935). Beiträge zur pathologischen Histologie des Endometriums des Rindes. [**Pathological Histology of Endometritis in Cattle**].—*Dtsch. tierärztl. Wschr.* **43.** 371-373. [12 refs.]

The uteri from 300 slaughtered cattle were examined. 3 per cent. were affected with chronic suppurative endometritis, 3·1 per cent. with the chronic non-suppurative type, 3·6 per cent. with tuberculous endometritis, and 1·6 per cent. showed pigmentation (haematogenous) of the mucosa, which was considered to be the remains of previous oestrous bleeding. The histology of the lesions in the various types correspond with what is already known.—J. R. M. Innes.

Cunningham, I. J., & Hopkirk, C. S. M. (1935). **Dietary Protein in Relation to Sterility.**—*N.Z.J. Sci. Tech.* **17.** 420-432. 8 figs., 4 tables. [22 refs.]

An exploratory experiment on rats has been attempted on account of an appreciable amount of temporary sterility in New Zealand in bulls grazed on rich pasture where the nutritive ratio is very narrow.

It has been shown that, with all known accessory food factors present in sufficient amounts, high protein feeding (65 to 82 per cent.) to rats will produce definite atrophy of the testes with complete sterility. Examination of series of rats' semen taken from the epididymis showed a gradual change in morphology of spermatozoa similar to that seen in bulls over a long period, with a final non-production of spermatozoa. This gradual change was also evidenced in sections of testes examined microscopically. Diets composed of a 15 to 18 per cent. protein, where the main protein was derived from maize and gelatine, also permitted atrophy of the testis to take place with similar morphological change in the spermatozoa.

Definite kidney changes were noted in all rats fed high protein.

No interference with female fertility was produced by this manner of feeding.
—C. S. M. Hopkirk.

I. Hindmarsh, W. L. (1934). **Sterility in Dairy Cows.**—*Aust. vet. J.* **10.** 162-172. 2 tables. [5 refs.]

II. Hindmarsh, W. L. (1934). **Some Indications of the Genital Health of a Dairy Herd.**—*Ibid.* 172-175. 1 table.

I. This is a discussion of all aspects of sterility in dairy cows, based on extensive field experience. It is considered that domestication and selective breeding have a definite relation to the incidence of sterility. So-called functional or non-pathological sterility is discussed and the author inclines to the opinion that cystic ovaries are usually secondary to metritis. In sterility due to malnutrition either oestrum fails to occur or it occurs but the cow does not conceive after repeated services ; in both instances normal breeding takes place when the diet is improved and the body reserves are re-established.

Vaginitis is probably the most common cause of pathological sterility. From 60 to 80 per cent. of cows were found to be affected with vaginitis, which is classified into (a) granular venereal disease, (b) congestion of the vagina, and (c) purulent vaginitis. Treatment was carried out extensively by douching with a 1 : 200 solution of zinc sulphate or in 1 : 4,000 " dibromin ". This resulted in a decrease in the incidence of vaginitis and appreciable improvement in the fertility of the herds and in the breeding index.

A considerable amount of sterility is caused also by cervicitis and metritis, as many as 70 per cent. of cows in one herd showing these conditions. Infection of the cervix tends to progress and to invade the uterus and may lead to permanent sterility. Streptococci appear to be the most common invading bacteria. Treatment of cervicitis and metritis presents certain difficulties but repeated douching with hypochlorite solution after parturition or abortion usually enables the cow to breed again.

Ovarian disease was not commonly encountered and when it occurred was usually associated with metritis.

II. Infertility is so common in dairy cattle and is of such great economic importance that it is best regarded as a herd problem rather than as a problem of the individual cow. The author reviews the normal sequence of events in breeding and indicates how departures from the normal, as shown by breeding records, may be interpreted. The article is of a general nature and does not lend itself to abstraction.—W. I. B. Beveridge.

Payard, H. (1935). La vaginite granuleuse contagieuse des ovins. [**Contagious Granular Vaginitis of Sheep**].—*Rec. Méd. vét.* **111.** 153-155.

This paper records two outbreaks of vaginitis in sheep, one in the Marne and one in the Meuse province. In the first outbreak, the symptoms shown were slight oedema, and irregular discoloration and distortion of the vulva. Granulations on the clitoris and vulva were present, and were sometimes so numerous as to cause wrinkling. The vagina contained a sticky mucoid discharge. The affected animals did not readily become pregnant, and it was necessary to keep the rams with the ewes for a longer period than usual.

The second outbreak was of longer duration and appeared to be clearing up. Distortion of the vulva, the presence of granulations and difficulty in getting the ewes pregnant were the principal symptoms shown.

No permanent sterility and no abortion were met with.

The condition is considered to be similar in nature to the same condition in cattle.—A. Brownlee.

Benesch, F. (1934). Ein Beitrag zur Extrauteringravidität beim Schwein. [**Ectopic Gestation in Swine**].—*Wien. tierärztl. Mschr.* **21.** 659-665. 4 figs. [7 refs.]

An illustrated account of a case of secondary abdominal pregnancy in a sow in which, at slaughter, a fully developed, partly mummified foetus was found. It had evidently escaped not long before through a rupture of the uterus, one horn of which showed two openings bridged by a short length of uterine horn of very small diameter. This consisted of the normal layers, but it had a strongly hypertrophied muscular layer, which abnormality may have been the cause of the rupture.—J. E.

Miessner, H., & Schoop, G. (1934). Aufzuchtkrankheiten, Gasödemerkrankungen. [**Diseases of Breeding Animals. Gas Gangrene**].—*Dtsch. tierärztl. Wschr.* **42.** 493-495. [1 ref.]

A resumé of data collected during work for the Reichszentrale für die Bekämpfung der Aufzuchtkrankheiten, situated in the Hygiene Institute of the Hanover Veterinary College, since its formation in 1922. [As the work has already been dealt with – see this *Bull.* **5.** 172 and 174. – outlines only are given here].

Diseases of the Horse.—Since 1922 contagious abortion [*Salmonella abortus-equi* infection] has been mastered so that it now gives little trouble. Infectious

diseases of foals have been studied and some progress in preventing losses from worms has been made.

Diseases of Cattle.—These have not been attacked with the same degree of success.

Diseases of Swine.—Piglet diseases have been investigated with much success : reference is made to infectious abortion, pyogenic infection, nutritional diseases and swine influenza.

Diseases of Fowls.—The rapid whole blood agglutination test for *Salmonella pullorum* infection gives very good results.

Gas Oedema.—The present position of research on anaerobic infection of cattle and sheep is outlined, reference being made to blackleg, bradsot (two types), " parablackleg " and " Novy oedema " [*Clostridium oedematiens* infection]. The German nomenclature is set out clearly.—W. von Düring (Wilmersdorf).

Milks, H. J. (1935). **Urinary Calculi.**—*Cornell Vet.* **25.** 153-164. 5 figs. [11 refs.]

Urinary calculi may be found in any part of the urinary tract, but, in the author's experience, the great majority in the dog have been found in the bladder. They vary in size and also in composition. Various theories of aetiology are given, reference being made to reaction of the urine, infection, deficiency of vitamin A and hyperparathyroidism, but no opinion is passed upon them. The reaction of the urine in some of the author's cases was alkaline, and the fact that most of the calculi found were phosphatic in composition also indicated alkalinity of the urine. In most cases, the animals were in good condition.

Surgical removal is discussed and, on the question of recurrence, the author states that if but one calculus is found, recurrence is unlikely, and that the greater the number found, the greater is the likelihood of recurrence.—W. J. Ironside.

Olson, C., Jr. (1935). **Spontaneous Hydronephrosis in the Dog, with Osteoid Tissue in the Renal Pelvis.**—*J. Amer. vet. med. Ass.* **87.** 74-80. 5 figs. [12 refs.]

The anatomical and histological features of a case of unilateral hydronephrosis in a dog are described. The exact aetiology could not be determined, although it is mentioned that the ureter showed lack of continuity at the level of the kidney pelvis. The wall of the hydronephrotic kidney showed simply atrophied renal elements and metaplastic bone formation was observed in the pelvis tissue. According to the author, hydronephrosis in the dog is rare, and mention is made of only four recorded cases from the literature. [The condition is by no means as rare as the paucity of recorded cases in the literature indicates ; in the last few years quite a number of advanced cases have been observed at autopsy and minor degrees of hydropelvis and hydroureter have been observed relatively frequently. Further, dog tissues when in a condition of low vitality, e.g. depression of blood supply, are notorious for the frequency with which calcification and ossification occur]. —J. R. M. Innes.

Boyd, W. L. (1934). **Clinical Observations of Lymphoid Hyperplastic Diseases of Cattle.**—*Cornell Vet.* **24.** 40-55. 6 figs. [6 refs.]

The author states that cattle are frequently affected by one of a group of diseases characterized by lymphoid hyperplasia, the types commonly encountered being simple lymphoma, lymphatic leucaemia and lymphosarcoma. This opinion is based upon the reports of condemnation of cattle at abattoirs for leucaemia by the Bureau of Animal Industry, United States Department of Agriculture, and from specimens received by diagnostic laboratories, together with clinical observations.

The symptoms of lymphoid hyperplastic diseases are not typical and depend to a great degree upon the regions of the body affected. When the disease is primary in the abomasum or intestines there is usually progressive emaciation accompanied by a gradual decrease in the milk yield and a capricious appetite. Rumination ceases, tympanites is not uncommon and there may be constipation followed by diarrhoea.

In lymphatic leucaemia there is enlargement of the superficial lymph nodes, usually bilateral, and occurring simultaneously in various chains of glands. Necrosis and sloughing of the overlying skin may result with escape of disintegrated tumour tissue. Bilateral exophthalmos may be observed in generalized cases.

The methods of diagnosis employed in these diseases are described and a detailed account is given of four cases examined by the author.—F. Blakemore.

Fenstermacher, R. (1934). **Familial Incidence of Lymphocytoma in Three Generations of the Domestic Fowl.**—*J. Amer. vet. med. Ass.* **84.** 863-877. 5 tables. [14 refs.]

Lymphocytoma is defined as a fatal neoplastic disease of fowls, the type cell of which is the undifferentiated lymphocyte. The results of experiments over a period of three years are given, and of the chicks reared and surviving after six months 15·9 per cent. died from the disease.

The author states that the condition seldom develops in birds less than six months of age. The incidence in the progeny of the various groups is detailed, the author finding fewer cases in the second generation, although the numbers available were considerably fewer, and no third generation was produced. The pathology of lymphocytoma is discussed and the author does not consider this disease to be a manifestation of neurolymphomatosis (fowl paralysis).—J. E. W.

Albrecht, A. (1935). Neuere Beobachtungen und Forschungen über Erkrankungen der Haustiere infolge Aufnahme von Futtermitteln. [**Diseases of Animals Originating from Food**].—*Münch. tierärztl. Wschr.* **86.** 109-114, 123-127, 133-138 and 148-152. [103 refs.]

A detailed review article which as such ought to be read in the original. The scope is as follows :– poisoning by plants either eaten directly or as contaminants of normally harmless foodstuffs ; illnesses following the ingestion of food infected with pathogenic micro-organisms (moulds, botulism toxin, etc.) ; illnesses due to fermentation of green food in the alimentary canal or to food infested with weevils, mites, etc. ; illnesses due to inorganic or organic chemical poisons and various deficiency diseases and morbid conditions associated with the diet ; finally reference is made to plants which inflict mechanical injury.

The original papers reviewed appear to date from 1929 onwards.—E. J. P.

Kossmag, M. (1935). Ist das Ausbleiben der Brunst durch Futterungsmassnahmen zu beheben ? [**The Connection of Dietary Deficiency with Sterility**].—*Tierärztl. Rdsch.* **41.** 420-424. [19 refs.]

This communication contains no new facts. A general discussion is given of the normal oestral cycle and of the factors which may upset the normal chain of events. Amongst such factors is an ill-balanced or deficient diet which may inhibit normal ovulation of fertile ova.—E. J. Pullinger.

Bendixen, H. C. (1935). Stivsyge hos vore Husdyr. [**Stiff Sickness (Mineral Deficiency) of Domestic Animals in Denmark**].—*Maanedsskr. Dyrlaeg.* **46.** 580-600. 2 figs. [2 refs.]

In winters following dry summers stiff sickness frequently occurs as a panzootic in cattle and swine. It has been shown through feeding experiments that in the course of a dry summer milk cows may easily get insufficient P. The decreased crop of roughages (hay and straw), the most important Ca sources of the winter feed, may cause the negative P- and Ca-balance existing from the summer to be continued through the subsequent winter. The deficiency of Ca becomes critical, while attempts are made to keep up the milk yield by an additional supply of foodstuffs, which are rich in P. Thus it is lack of P during summer and of Ca during winter that causes the panzootic occurrence of stiff sickness. Treatment is regulated accordingly.

An examination of rations for swine shows that it is again Ca that is the critical factor. In this case the predominant Ca source is skimmed milk. The amount that can be given is always decreased after a dry summer, but whilst protein supplements can be provided, such as by means of concentrated foodstuffs, the reduced amount of milk in the feed of the pigs will bring the Ca in the feed below the critical point.

A reference is made to the rainfall in 1904, 1921 and 1934, which were the driest summers in Denmark in the present century.—H. C. B. (Copenhagen).

## PUBLIC HEALTH.

Bouchet, A. (1935). Une organisation moderne du service sanitaire vétérinaire en France. **[A Modern Veterinary Public Health Service in France].**—*Bull. Soc. vét. prat. Paris.* **19.** 90-107 and 111-120.

The author's project for such a service in France is based upon its being executed by specialists trained in their duties by an apprenticeship or previous service and appointed according to the animal population and the consuming public in each district. They would supervise the production and inspection of all meat, milk, etc., before sale. He claims that the present laws will not be properly enforced without a whole-time state veterinary public health service to supervise (a) epizootics ; (b) inspection of food products, and (c) organization of animal husbandry. The cost of the whole service, working under the authority of the Minister of Agriculture, would be met by existing levies for the inspection of meat, and compensatory levies for the inspection of milk, eggs, fish, " classified establishments", etc. All abattoirs would gradually become communal or intercommunal.

The present meat and milk laws leave the responsibility for the organization of the service of inspection to the mayors, who may, however, be superseded by state administration.

The second part of the article outlines the debate on these proposals by various members of the Society and names the committee who will study the question further.—C. V. Watkins.

von Ostertag, R. (1934). Die tierärztliche Kontrolle des Milchverkehrs. **[Veterinary Control of the Milk Trade].**—*Z. InfektKr. Haustiere.* **47.** 1-23. [7 refs.]

A comprehensive review is presented of the whole question of the control of milk supplies and it is only possible to give here a brief note of von Ostertag's main conclusions.

Healthy milk can only be obtained from healthy cows and other milk animals. Numerous serious and often fatal diseases can, on the other hand, be transmitted

by the milk of diseased cows. This can be avoided by the temporary or permanent exclusion of such animals from the milk market, a matter which falls into the rational province of the veterinarian. His services are therefore a necessity in the official regulation of the milk traffic. Pasteurization and the testing of milk for freshness, cleanness and bacterial count are, despite their usefulness, no substitute for veterinary milk control. Milk for pasteurization should be officially controlled.

In herds supplying certified or graded milk, veterinary examination should be carried out at frequent intervals and should be supplemented by regular bacteriological and histological examination of milk samples. For the avoidance of the transmission of tubercle bacilli in milk it is at least necessary to exclude all milch animals which have udder tuberculosis or open pulmonary, uterine or intestinal tuberculosis. The importance of the danger of the transmission of brucella infection by milk needs further classification but it has been shown that the danger from contact is greater than that from drinking raw milk. Milk from animals infected with *Streptococcus agalactiae*, the cause of the common chronic bovine mastitis, is not to be looked upon as dangerous to human beings, and this contrasts with that from animals affected with *Str. pyogenes*, which has caused serious outbreaks of disease in North America. It is sufficient in the former case to exclude obviously altered milk and to enforce the processing of milk which contains microscopically recognizable pus, whilst milk which has merely a slightly abnormal cell content can be sold without limitation. Infection of milch animals with bacteria of the " paratyphus-enteritis group " needs greatest watchfulness by veterinary officers because milk which contains such organisms as a result of local (mammary, uterine or intestinal) or general infection may be injurious to human health.—A. W. S.

Wright, N. (1935). **Methods of Reducing Infection in the Milk Supply.**—*Trans. roy. med.-chir. Soc. Glasgow 1934-1935.* pp. 30-32 and 33-40. Suppl. to *Glasg. med. J.* **123.**

There are two points at which infection can be reduced.

(1) At the point of production (the farm). There, the measures necessary are :– (a) Cleanliness. This is purely a matter of educating the producer, and a large reduction in the bacterial count can easily be achieved. (b) Removal of pathogenic organisms. The author considers the Tuberculosis Order and the Milk and Dairies Acts to be relatively ineffective in reducing *Mycobact. tuberculosis* in milk. He considers that the only effective method would be the complete eradication of tuberculosis from the herd by a reliable diagnostic test. He does not consider the menace of *Brucella abortus* and streptococcal mastitis to be very great.

(2) At the point of distribution. This deals with the various methods of pasteurization and does not contain anything new.

The author is of the opinion that the keystone in the production of milk free from infection is the human operator – the one uncertain factor. He considers that the ideal milk would be from tuberculin-tested herds, cleanly produced, efficiently pasteurized and hygienically bottled.—G. Dods Munro.

Frank, L. C. (1935). **The Present Status of Milk Control in the United States.** —*J. Amer. vet. med. Ass.* **86.** 347-353. 2 tables. [1 ref.]

The author, speaking of the history of milk-borne diseases in the United States of America, shows in table I that there has been an average of 43 milk-borne outbreaks reported for each year from 1924 to 1933 inclusive. These outbreaks refer to typhoid, diphtheria and scarlet fever, but do not include tuberculosis, undulant fever or intestinal disturbances. With reference to the death rate from non-pulmonary tuberculosis, figures per 100,000 are given in table II for the

years 1900 to 1932, showing a decrease from 21·4 in 1900 to 6·5 in 1932. In describing the eradication of tuberculosis in cattle, it is stated that the number of cattle tested in the U.S.A. has steadily increased from 20,000 in 1917 to about 13 million in 1933. The average percentage of reactors has dropped from 4 in 1922 to 1·4 in 1932.

Pasteurization is looked upon as the most effective single weapon against milk-borne diseases such as typhoid fever, diphtheria, scarlet fever, etc. Since 1923 great progress has been made in the adoption of uniform effective milk legislation throughout the States. The author prophesies that in the next generation the U.S.A. will practically have eliminated milk-borne diseases and that this will be brought about mainly by the adoption of uniform effective milk legislation. —Brennan DeVine.

Pelc, H. (1934). La production et la consommation du lait dans le district de Český Brod au point de vue de l'hygiène. [**The Production and Consumption of Milk in the District of Cesky Brod, Czechoslovakia, from the Hygienic Point of View**].—*Trav. Inst. Hyg. publ. Tchécosl.* **5.** 39-83. 1 fig., 27 tables, 1 map. [Abst. from abst. in *Bull. Hyg., Lond.* **10.** 404].

A survey of the farming community of a country district not far from Prague was undertaken to study the factors concerned in the rather high incidence of tuberculosis amongst the human population. It was found that the dairy hygiene was unsatisfactory and tuberculin tests on cows showed that 45 per cent. gave positive reactions. No information is given on the extent of the bovine type of tuberculosis among the people.—J. E.

Grinsted, P., & Plum, N. (1935). Nogle Undersøgelser over Tuberkelbacillers Levedygtighed i langtidspasteuriseret Maelk varmebehandlet paa Flaske. [**Viability of Tubercle Bacilli in Slowly Pasteurized Milk (30 Minutes at 63° to 65°C.) in the Bottle**].—*Maanedsskr. Dyrlaeg.* **46.** 515-520. 4 tables.

Pasteurization of tuberculous milk was performed with mixtures of milk from herds in which among four, ten and 20 cows there was one cow with tuberculosis of one quarter of the udder. In four of the experiments the tubercle bacilli were killed by the heating. In one experiment, in which about half of the milk originated from a tuberculous gland, there were living tubercle bacilli in one of two bottles after pasteurization.—H. C. Bendixen (Copenhagen).

Pullinger, E. J. (1935). **Examination of Milk Products for Tubercle Bacilli and Brucella Abortus.**—*Lancet.* **228.** 1342-1344. 1 table. [3 refs.]

Samples of cream, butter and cheese were submitted to the biological test with guinea pigs. Of 31 samples of raw cream examined, 12 were found free, 16 contained tubercle bacilli and 11 *Br. abortus*. Eight of the infected samples contained both organisms, eight of them tubercle bacilli alone and three *Br. abortus* alone. Thirty-five samples of pasteurized cream examined were found free. It was found that pasteurization of cream in shallow layers by the flash process at 180°F. was destructive to pathogenic contaminants. Thirty-nine samples of butter were found free. None of the samples of soft cheese contained tubercle bacilli or *Br. abortus*. Two contained saprophytic acid-fast organisms. Fourteen samples of cheese two days old were examined: all these were found free. Of nine samples of hard cheese examined when seven days old, one contained tubercle bacilli and *Br. abortus* and one contained tubercle bacilli alone. The fact that tubercle bacilli and *Br. abortus* were found in cheese seven days old, but not when 21 or more days old, indicates that in the case of hard cheese auto-sterilization takes place.—Brennan DeVine.

Orla-Jensen, & Winther, M. O. (1935). La réaction de Storch. **[The Storch Reaction (for Heated Milk)].**—*Le Lait.* **15.** 247-251. 1 table. [7 refs.]

The authors set out to prove that the Storch test for heated milk is not reliable. They state that heated milk which gives a negative Storch reaction immediately after heating will give a positive reaction if brought to a certain precise temperature above 82°C. after standing for some hours. They state that the peroxidase in the serum of the milk is broken up through the heat, but that this enzyme in the leucocytes is not affected. It is these latter which gradually spread through the milk. Barthel has shown that the dirt in the centrifuge which is composed for the most part of leucocytes is very rich in peroxidase. Milk which gives a negative Storch reaction following momentary heating at 80°C. will give a positive reaction if a little dirt from the centrifuge is added. Orla-Jensen has further previously shown that the peroxidase of milk which Storch supposed to be destroyed at a certain temperature is not wholly destroyed. The table submitted sets out the reaction found in milk heated to 82°, 84°, 86° and 90°C. respectively, and the effect in three and 21 hours after heating. If the heating is so short that it does not destroy the peroxidase included with the leucocytes, one must fear that the tubercle bacilli included in the débris of the milk will not be destroyed.—Brennan DeVine.

## THERAPEUTICS.

Launoy, L., & Prieur, M. (1935). Contribution à l'étude de l'essai biologique de la tryparsamide. **[The Biological Test of " Tryparsamide "].**—*Bull. Soc. Path. exot.* **28.** 389-398. 1 table. [6 refs.]

Recently Pottier and van den Branden have criticized the American standard test of samples of " tryparsamide " on the ground that the test dose of 0·75 g. per kg. body weight is too low, and that the lethal dose for rabbits considerably exceeds the 0·9 g. per kg. body weight laid down by the Rockefeller Institute. The authors undertook an investigation of the toxicity of a large number of samples of French " tryparsamide " and a few samples from America and Belgium. Defining the " supported dose " as the dose which only causes death in 50 to 60 per cent. of rabbits within 30 days, they found this to be 0·75 g. per kg. body weight, although if the observation time was reduced to seven days a larger dose would allow the requisite number of rabbits to survive. As regards the lethal dose, quantities up to 2·5 g. per kg. body weight did not cause a 100 per cent. mortality. The authors stress that a chemical examination of samples should be made, and that they should contain 24·6 to 25 per cent. of arsenic, not more than 0·5 to 0·6 per cent. of moisture, and not more than 0·02 per cent. of anilarsenic acid.

Working with mice, the authors found that the toxic dose, which would allow the survival of 50 per cent. of mice weighing 20 g. for ten days, was 0·09 g. The trypanocidal dose, judged on the power to prevent a relapse of a strain of *Tryp. brucei* in mice weighing 20 g. for 20 days, was 16 mg., and the coefficient of trypanocidal activity was therefore between 1 : 5 and 1 : 6·5.—U. F. Richardson.

Murgatroyd, F., Russell, Helen, & Yorke, W. (1934). **Studies in Chemotherapy. XI. The Trypanocidal Titre of the Serum of Rabbits after Intravenous Injection of Various Compounds of Arsenic.**—*Ann. trop. Med. Parasit.* **28.** 227-242. 6 tables, 4 graphs. [8 refs.]

This article records experiments in which the trypanocidal titre of rabbit serum, at varying intervals after the administration of drugs, was tested on suspensions of *Tryp. rhodesiense* incubated for 24 hours at 37°C. In the case of

arsenobenzol and the trivalent arsenical compounds, represented in these experiments by reduced " tryparsamide ", an enormously high trypanocidal titre was immediately conferred. This titre, which was proportional to the dose of drug, fell immediately, rapidly at first and then slowly. In the case of reduced " tryparsamide " the fall in trypanocidal titre was so rapid that, with certain doses, practically all value had been lost in six hours. In the case of the pentavalent arsenicals (" tryparsamide ") the value rose to a maximum in six hours. The trypanocidal action of " tryparsamide " was greater if the blood was allowed to clot in the usual way than if the blood corpuscles were removed, and it is suggested that the red blood corpuscles may be largely involved in the reduction of arsenicals to their trivalent form.—U. F. Richardson.

Launoy, L. (1934). Nouveaux faits relatifs à l'étude et au traitement de l'infection expérimentale du chat par *Trypanosoma annamense*. [**New Facts in the Treatment of Experimental Infections of the Cat with** *T. annamense*].—*Bull. Soc. Path. exot.* **27.** 323-329. [6 refs.]

This article records the observation that *T. annamense* [= *T. evansi*] infection in cats may be very chronic and may progress to paralysis. The trypanosomes may disappear from the peripheral circulation, but may still be found in oedematous swellings. " Fourneau 309 " in doses of 20 to 30 mg. per kg. body weight, was effective in some cases but failed in others. The author considers that early infections may respond to smaller doses than those required for older cases.

—U. F. Richardson.

Henry, T. A., & Gray, W. H. (1935). **Trypanocidal and Anti-Malarial Drugs.**—*Trop. Dis. Bull.* **32.** 385-390.

The authors explain the confusion which has arisen in the nomenclature of synthetic drugs used for the treatment of trypanosomiasis and malaria. As the systematic chemical names are almost impossible for daily use, the chemists themselves usually adopt a number. When a drug proves to be promising it is patented and the patentee generally takes the further step of registering a trade-mark name. As these patents expire, and should the drug be admitted to the pharmacopoeia, the authorities coin a new name which is non-proprietary and available for general use, but the name used in one country may be different from that used in others. The article concludes with notes on the chemical composition and nomenclature of the majority of drugs used in the treatment of trypanosomiasis, malaria and piroplasmosis. The following instances of the same drug disguised under another name, or in the form of a derivative, seem to have most importance :–

Tryparsamide—tryparsone, glyphenarsine, tryponarsyl, trypotan and novatoxyl.

Acetylarsan—stovarsol.

Salvarsan—606, arsphenamine, neosalvarsan, novarsenobenzol, novarsenobillon and Ehrlich 914.

Germanin—Bayer 205, Fourneau 309, moranyl, naganol (a preparation for veterinary use).

Trypaflavine—303, acriflavine and gonacrine.—U. F. Richardson.

Augier, P., & Faure-Brac. (1935). Recherches sur l'action thérapeutique de l'antimonio-thiomalate de lithium dans la leishmaniose canine. [**The Therapeutic Action of Lithium Antimony Thiomalate in Canine Leishmaniasis**].—*Rev. Path. comp.* **35.** 796-817. 12 figs., 1 table. [3 refs.]

This article records the treatment of seven cases of canine leishmaniasis with lithium antimony thiomalate. Intramuscular injections of doses approximating 2 c.c. of a 6 per cent. solution were given every second day. Five of the animals apparently made a satisfactory recovery. Out of over 1,000 dogs treated with neostibamine during the last ten years, complete cure has only been attained in 3 to 5 per cent. of cases. The authors claim that the antimony thiomalate is at least as efficient as other antimonials, is cheaper, less toxic, and has an advantage in that it can be administered intramuscularly.—U. F. Richardson.

Cernaianu, C., & Radef, I. (1935). Essais de traitement comparatif de la piroplasmose vraie des bovidés par le trypanbleu et la trypaflavine (gonacrine). [**Treatment of Bovine Piroplasmosis with Trypan Blue and " Trypaflavine "** (**" Gonacrine "**)].—*Bull. Soc. Path. exot.* **28.** 368-375. 2 tables. [6 refs.]

On the occurrence of outbreaks of bovine piroplasmosis due to *Babesia bigemina* in the valley of the Danube, the authors took the opportunity of treating 21 of the affected cattle with trypan blue and 34 with " trypaflavine " in order to compare the efficiency of the two drugs under similar conditions. Both drugs were administered intravenously, the trypan blue at a dose of 30 c.c. of a 1 per cent. aqueous solution, and the " trypaflavine " at a dose of 1 g. dissolved in 50 c.c. of distilled water. Two animals died in both groups of treated animals, but they were treated at such a late stage of the disease that their deaths cannot be ascribed to the inefficiency of the treatment. The temperature curves indicated that both drugs had approximately the same value, the fever subsiding in all animals in 24 to 48 hours. From the clinical observations the authors consider that " trypaflavine " is to be preferred for the treatment of severe or advanced cases of the disease.—U. F. Richardson.

Velu, H., & Zottner, G. (1934). La gonacrine dans le traitement de la babesiellose ovine et de la nuttaliose. [**" Gonacrine " in the Treatment of Ovine and Equine Piroplasmosis**].—*Bull. Soc. Path. exot.* **27.** 835-839. [2 refs.] [Also published in *Rev. vét. milit.* **18.** 413-417].

In this article the authors defend the efficacy of " gonacrine " (" trypaflavine ") in the treatment of ovine and equine piroplasmosis, and reaffirm their opinion that this drug has considerable value in all babesia infections and some value in theileria infections, and should be used in all suspected cases of piroplasmosis in which delay must occur before a definite diagnosis can be made. They record the treatment of ten sheep infected with *Babesia ovis* with 3 c.c. of a 5 per cent. solution of " gonacrine ", with the result that in all the animals the temperature fell to normal within 24 hours, and only one animal died and this was treated when *in extremis*. Two equines infected with *B. equi* were also successfully treated by the intravenous injection of 1 g. of " gonacrine " in a 5 per cent. solution.
—U. F. Richardson.

Smythe, A. R. (1935). **Notes on the Treatment of British Bovine Red-Water.** —*Vet. Rec.* **15.** 635-637.

The author discusses the value of potassium antimony tartrate, trypan blue, piro blue, quinine and " acaprin " in the treatment of British redwater. In his opinion the first four drugs can be dismissed as they are either contraindicated, have marked disadvantages or have little or no influence on the disease. " Acaprin ", however, is vastly superior and has produced striking results in a large percentage of cases, but even with this drug there remain a few cases which do not respond to treatment.
—Gwilym O. Davies.

—. (1935). **Akiron. A New Preparation for the Treatment of Piroplasmosis, Babesiellosis and Nuttalliosis.**—*J. S. Afr. vet. med. Ass.* **6.** 54-56.

" Akiron " is a new drug placed on the market for the treatment of piroplasmosis by the firm of Bayer. It is more reliable than trypan blue and is without most of its disadvantages. It is a urea derivative, and may cause certain ill effects which can be counteracted by combining it with an analeptic " rephrin ", a combination of " recradin " and suprarenin (adrenaline). Twenty-four hours after inoculation all parasites disappear, and it is probable that large doses would sterilize. The doses for the different animal species are given. The drug is sold under the name of " akiron R ", which means that " rephrin " has been added.
—E. M. Robinson.

Dikmans, G. (1935). **Treatment for Tapeworm, *Moniezia*, Infestation of Sheep.** —*N. Amer. Vet.* **16.** No. 7. 29-32.

This paper gives a partial abstract of an article by Skriabine and Schulz [this *Bull.* **5.** 358.] and discusses their observations and recommendations. The author does not discuss the validity of the claims of the Russian authors, but points out that their system of control for moniezia infestation is based upon the resistance of lambs to reinfection after a period of infection lasting for from two to three months, upon the longevity of infestation in a pasture not extending beyond 18 to 24 months, and upon the efficacy of copper sulphate as a vermifuge. He points out that, providing the observations of the Russian authors are correct, the tapeworm problem in sheep may be handled by treating infected ewes before lambing, and placing the lambs on pasture which has not been occupied by ruminants for 18 to 24 months. If on infected pastures, the lambs should be treated every 30 days, beginning at one month old. Either of these methods should rid the sheep and the pasture of infestation.—E. L. Taylor.

Ross, I. C., & Gordon, H. McL. (1934). **The Influence of Starvation on Anthelmintic Efficiency.**—*Aust. vet. J.* **10.** 135-142. 4 tables. [6 refs.]

A uniform group of young merino lambs not previously exposed to infestation with *Haemonchus contortus* were each artificially infested with 7,000 *H. contortus* larvae. After six weeks had elapsed, daily egg counts were made for 14 days. The lambs were then divided into five comparable groups of five each and treated as follows :– (1) copper sulphate (30 c.c. 2 per cent. solution) unstarved ; (2) copper sulphate (30 c.c. 2 per cent. solution) starved 24 hours ; (3) carbon tetrachloride (2 c.c. in 3 c.c. liquid paraffin) unstarved ; (4) carbon tetrachloride (2 c.c. in 3 c.c. liquid paraffin) starved 24 hours, and (5) untreated controls.

Egg counts were continued for six days after treatment ; the lambs were then killed and the remaining *H. contortus* counted. There was no significant difference between starved and unstarved groups receiving either drug. A greater efficiency was obtained by both drugs against female than male worms.

A note is added on the value of egg counts in determining the degree of infestation with *H. contortus*, it being shown that there is a significant correlation between the total eggs produced and the number of females present. A high degree of variation in susceptibility to infestation was shown by experimental lambs in spite of their uniform age.—H. McL. Gordon.

Harwood, P. D. (1934). **Effect of Certain Physical Factors on the In Vitro Testing of Anthelmintics.**—*Proc. Soc. exp. Biol., N.Y.* **32.** 131-133. [Copied *verbatim* from *Trop. Dis. Bull.* **32.** 237. Signed C. L.]

*In vitro* tests of drugs against *Ascaris lumbricoides* show that a " liquid excess " of the drug is far more effective than a solid one.

If hexylresorcinol (or certain other drugs) is allowed to stand in contact with 1,000 parts of 0·9 per cent. sodium chloride solution at 37°C., a solid excess will remain. If the same mixture is heated and allowed to cool to 37°C. " the undissolved excess is a supercooled liquid ". The latter is far more rapidly lethal than the former to ascaris *in vitro*.

WRIGHT, W. H., & BOZICEVICH, J. (1935). **Tests of Anthelmintics for the Removal of Rabbit Parasites.**—*N. Amer. Vet.* **16.** No. 7. 20-29. [7 refs.]

This paper reports on tests carried out to ascertain the value of oil of chenopodium, tetrachlorethylene and carbon tetrachloride for the anthelmintic treatment of rabbits infected with the pin-worm *Passalurus ambiguus*, the stomach worm *Obeliscoides cuniculi*, the small intestinal worm *Trichostrongylus calcaratus* and the whip-worm *Trichuris leporis*. Oil of chenopodium in doses of 0·15 c.c. per kg. body weight, followed by an adequate dose of castor oil, removed from 52·4 to 100 per cent. of pin-worms from two rabbits.

Tetrachlorethylene in doses of 0·3 c.c. and 0·5 c.c. per kg. body weight followed by Epsom salt removed 70·4 and 90·6 per cent. of pin-worms. The same treatment following a fast was found to be very effective for the removal of *O. cuniculi*, as also was a dose of 0·3 c.c. per kg. body weight of carbon tetrachloride. None of the treatments were, however, effective for the removal of *Trichostrongylus calcaratus* nor *Trichuris leporis*.—E. L. TAYLOR.

ACKERT, J. E., & GRAHAM, G. L. (1935). **The Efficacy of Carbon Tetrachloride in Roundworm Control.**—*Poult. Sci.* **14.** 228-231. 1 fig., 1 table. [8 refs.]

Critical tests were carried out on 320 chickens experimentally infected with *Ascaridia lineata* by the administration of 50 embryonated eggs. A dose rate of 10 c.c. of carbon tetrachloride per kg. body weight was found to be too toxic, but 4 c.c. per kg. was safe and also 100 per cent. efficient. Egg production was materially reduced, however, for a period of seven to ten days following the treatment. Tetrachlorethylene (which is a more expensive drug) was also tried on a few chickens but appeared to be more toxic than carbon tetrachloride.—E. L. T.

MURNANE, D. (1934). **Carbon Tetrachloride : Its Effect on the Appetite of Sheep.**—*J. Coun. sci. industr. Res. Aust.* **7.** 145-146. 3 tables. [1 ref.]

It was shown experimentally that there was no indication that sheep on green feed showed any loss of appetite following the administration of therapeutic doses (2 c.c.) of carbon tetrachloride. No dullness or drowsiness was detected after drenching. Animals on dry feed showed a definite drop in intake of food following 24 hours' starvation and drenching, but to no greater extent than did the controls following 24 hours' starvation without drenching. In neither case was there any evidence of a check in the weights of treated sheep.—H. McL. GORDON.

SPINDLER, L. A. (1934). **Effect of Copper Sulphate on Infective Larvae of the Nematodes *Stephanurus dentatus* (Stephanuridae) and *Oesophagostomum* spp. (Strongylidae).**—*Proc. helminth. Soc. Wash.* **1.** 42.

Spindler has tested a control method recommended by DE JESUS that pig pens should be sprayed with a 1 per cent. copper sulphate solution for the control of the kidney worm. Application at the rate of 7 c.c. to 15 c.c. of the 1 per cent. solution per square foot repeated daily over a period of two weeks, however, failed to show any effect upon the larvae.—E. L. TAYLOR.

LAMSON, P. D., MOLLOY, D. M., & BROWN, H. W. (1935). **Field Studies of the Anthelmintic Action of Ortho-heptylphenol and 6-hexyl-meta-cresol against Ascaris lumbricoides, Necator americanus and Trichuris trichiura.** —*Amer. J. Hyg.* **21.** 188-199. 5 tables. [4 refs.]

These two substances have given promising results *in vitro* but had not previously been tested *in vivo*. The authors here give a report of the results of practical tests which they carried out on worm infestation in the human being. Ortho-heptylphenol reduced the egg count in ascariasis 35 per cent., in uncinariasis 60 per cent., and in trichuriasis 40 per cent. 6-hexyl-meta-cresol reduced the egg count 55 per cent. in ascariasis, 70 per cent. in uncinariasis and 30 per cent. in trichuriasis. Doses ranged up to 4·2 c.c. and no untoward results were observed. —E. L. TAYLOR.

STEPHENSON, H. C. (1935). **Urinary Antiseptics.**—*Cornell Vet.* **25.** 146-152. [12 refs.]

The groups of agents discussed are dyes, volatile oils, boric acid, bacteriophage and compounds of formaldehyde, silver, resorcinol and salicylic acid.

Of dyes, pyridium is most effective against *Bact. coli* and serenium against cocci. With reference to hexamine, two findings of MILLER and CHU are given :– (1) that urine can be rendered acid by the administration of ammonium chloride and (2) that the antiseptic power of urine is raised considerably if the intake of fluid is restricted during treatment. The irritation caused by salicylic acid compounds can be overcome by the administration of sodium bicarbonate. Flushing of the bladder with antiseptic solutions should be considered a proper adjunct to internal medication.—W. J. IRONSIDE.

SCHMIDT, W. (1935). Ueber die Behandlung der Streptokokken-Mastitis mit Entozon. [**Treatment of Mastitis with " Entozon "**].—*Dtsch. tierärztl. Wschr.* **43.** 65-68.

Treatment was carried out in four herds containing 15, 38, 41 and 152 cows of which 53, 61, 41 and 63 per cent. respectively were infected with *Streptococcus agalactiae*. The method was that recommended by SEELEMANN. All cows were examined bacteriologically before and at intervals after treatment, an enrichment medium being used to detect small numbers of streptococci.

In the first herd eight cows were treated at the beginning of the drying period. All were cured. In the second herd six were treated and none were cured. The failure is attributed largely to the use of a very hard spring water although sterilized and filtered.

In the third herd all of the 17 infected cows were treated, the treatment being carried out during lactation. The result of the treatment is difficult to follow owing to disposals for other reasons but only about one half of the treated quarters were free from infection a month after treatment and several subsequently showed infection again, necessitating further treatment. This was carried out during the dry period and at the time of report six out of seven of these animals were apparently cured.

In the fourth herd the cows were examined regularly at the beginning of the dry period in addition to the routine examinations and all infected cows treated. Of the 64 thus treated, 93 per cent. were free of streptococci after the next calving and, although some relapses or reinfections occurred, 77 per cent. were still free when examined two to four months later. In this herd the " entozon " was diluted in distilled water.

The author draws attention to the danger of treating cows with acute inflam-

mation or oedema of the udder and prefers in general the dry period on account of the loss of milk in lactating cows during the week following treatment. Distilled water is also favoured where practicable. The work reported was done as part of the new official campaign for mastitis control in which diagnosis and control are carried out with state assistance.—A. W. STABLEFORTH.

ROCHMANN, R. (1935). Forsøk med aphrodisiaca og seksualhormoner mot ufruktbarhet hos sølvrev. **[Treatment of Infertility in Silver Foxes by Aphrodisiacs and Sexual Hormones]**.—*Norsk VetTidsskr.* **47.** 58-66. 1 table.

These experiments have been carried out at the Research Farm for Silver Foxes at Heggedal, Norway. As many as 25 per cent. of the total number of females have been reported in certain areas to be infertile. The chief cause is that normal oestrum does not occur and thus the vixen does not take the dog. The trouble is more often seen in young than in older animals. Some external factors which may have influenced this condition are suggested to be :– unsuitable composition of diet and deficiency of meat ; an increasing tendency to keep the animals more closely fenced in, and the growing custom of keeping only one male for every two, three or four females.

The efficacy of some aphrodisiacs and hormone preparations has been tried, such as tincture of cantharides, yohimbine hydrochloride, folliculin, " prolan ", and the two last in combination. The results have not been promising, since only a few animals came into oestrum after treatment, and it was uncertain in these instances whether or not they were the result of the treatment. The experiments are being continued.—GUSTAV NAERLAND (FARSUND).

ROBERTS, E., & DAWSON, W. M. (1935). **Effect of Fowler's Solution on Animals.** —*Bull. Univ. Ill. agric. Exp. Sta.* No. 413. pp. 16. 2 figs., 11 tables. [6 refs.]

Fowler's solution, which is a 1 per cent. solution of arsenious oxide in potassium bicarbonate, is used extensively for the preparation of animals for show purposes. It was administered to rabbits in doses of 0·75 c.c. per day, and the effect was observed on the sexual activity and vitality of offspring.

Treated males produced smaller and less healthy litters than did untreated males, double matings by different males being used in all cases. Administration to immature animals resulted in retarded growth, possibly through increased susceptibility to disease, and adult animals were more prone to the contraction of respiratory diseases. The most important finding, however, was the impairment to sexual activity in treated males and the production of unhealthy offspring by treated females.—G. D. SHEARER.

MILKS, H. J. (1934). **Uses of some Drugs acting upon the Circulatory System.** —*Rep. N.Y. St. vet. Coll. 1932-1933.* pp. 89-95.

The greater part of this article consists of what may be called text-book descriptions of the actions and uses of cardiac stimulants, cardiac depressants, vaso-constrictors and vaso-dilators.

In dealing with atropine, the author states that he has found it extremely useful in some cases of distemper in which dyspnoea was present. Concerning aconite, it is stated that in medicinal doses it has no perceptible action upon heart beats, upon temperature or as a diaphoretic. Regarding the uses of " pituitrin " the author, in performing Caesarean section, always injects a dose at about the time that suturing of the uterus is finished.—W. J. IRONSIDE.

Weber. (1935). Komplement als Heilmittel. [**Complement as a Therapeutic Agent**].—*Z. InfektKr. Haustiere.* **47.** 323-327.

On the basis of an inadequate number of experiments, it is concluded that normal complement has value as a therapeutic agent. Mice were dosed with *Erysipelothrix rhusiopathiae* together with special antiserum and fresh normal serum, the protective value of the latter two types of serum being compared. Similar experiments were carried out on pigs with swine fever virus.—E. J. P.

## POISONS AND POISONING.

—. (1934). Vergiftungen. [**Report on Poisoning of Livestock**].—*Veröff. beamt. Tierärz. Preuss., 1931-1932.* Pt. II. pp. 92-104.

This report gives a summary of cases of poisoning during the period under review and covers a wide range of cases of mineral and vegetable poisoning. For the most part the cases illustrate well-known poisonings and do not call for special comment. Among rarer cases, note is made of the poisoning of swine by seeds of *Anamira* spp., of which very scanty records are to be found in the veterinary literature. The active principle, picrotoxine, causes stupefaction and is used as a fish poison. The symptoms set in within an hour of feeding.

A case is also reported in which nine of 11 young pigs died from eating a chicken corn mixture which contained corn-cockle (*Agrostemma*) seeds in the proportion of 34 seeds to 100 g. of corn.

An interesting case was one in which a cow developed thirst, diarrhoea, heart weakness and disequilibrium after taking 2·5 kg. of sodium sulphate in three doses during an afternoon.

Two cases of damage to horses by bee stings are noted, and one in which a number of ducks died after being turned into a cabbage field in order to get rid of caterpillars. In this connection it is to be noted that some species of caterpillars have been alleged to cause damage.—G. D. Lander.

Draize, J. H., & Beath, O. A. (1935). **Observations on the Pathology of Blind Staggers and Alkali Disease.**—*J. Amer. vet. med. Ass.* **86.** 753-763. 12 figs. [2 refs.]

" Blind staggers " and alkali disease are believed to be caused by the presence of selenium in the grass, cereals and forage crops of Wyoming. Molybdenum has also been shown to cause similar symptoms. The animals show symptoms of vitamin A deficiency, anaemia and icterus. Approximately 100 cattle and sheep were autopsied and the gross and microscopic pathology of both diseases are described in detail.

Alkali disease seems to be a chronic form of " blind staggers ", and very little difference in the pathology of the two diseases is observed except that in alkali disease the heart is found to be invariably atrophied and the liver more or less cirrhotic. In alkali disease, also, abnormal hoof growth is observed and, although erosion of the ends of the long bones is characteristic of both diseases, it is more prevalent in alkali disease.—G. D. Shearer.

Caillot, E. (1935). Intoxications des bovidés par les solutions arsenicales utilisées en agriculture contre les parasites. [**Poisoning of Cattle by Arsenic Solutions used as Plant Parasiticides**].—*Bull. Soc. Sci. vét. Lyon.* **38.** 131-146. 1 table. [1 ref.]

In spite of the extensive use of arsenical sprays on fruit trees the poisoning

of animals by arsenic is not very frequent. The spray used contains on an average 200 g. sodium arsenate and 600 g. lead acetate in 100 litres of water. Lead arsenate is thus present partly in solution and partly in suspension. Spraying takes place at the end of April or the beginning of May.

Poisoning may occur by spilling the spray in the surrounding herbage, or by the animals eating the young leaves of the trees which have just been sprayed. Symptoms, which develop 12 to 15 hours after ingestion, are loss of appetite, lowered temperature, colic, salivation, evil smelling diarrhoea, sometimes streaked with blood, and weak pulse. Sometimes the animal becomes paralyzed and dies 24 to 48 hours later. The lesions are those of a severe gastro-enteritis with irritation of the whole digestive tract. Prognosis is always grave because of the ease with which the poison is absorbed.

Clinical notes are given on seven cases of arsenical poisoning in cows.

—G. D. Shearer.

Hundhammer, W. (1935). Gefährdung der Weidetiere bei Kalkstickstoff-Düngung ? [**The Danger of Calcium-Nitrogen Fertilizer to Grazing Animals**].—*Tierärztl. Rdsch.* **41.** 355-358. [5 refs.]

The author found that, if experimental animals were given food impregnated with the fertilizer, they would not eat sufficient to produce poisoning. If they died during the investigation death was always due to starvation and not to the fertilizer. If the fertilizer were given *per os* the reactions were (1) local (due to the CaO) which consisted in irritation, inflammation and corrosion of the gastric mucous membrane and (2) resorptive (due to the cyanamide) which were inhibitions of the respiratory and cardiac systems. The toxic dose for rabbits was 3 g. per kg. body weight.

For his major experiment he used ten milch cows and five sheep. He dressed ten paddocks with 1 cwt. of fertilizer to the acre using two different (commercial and easily obtainable) kinds of fertilizer. Four of the paddocks were watered with about 4 mm. the same day as they were dressed ; four were not watered and two were used for controls. In the first experiment five cows were put into the paddocks the same day as they had been treated and the animals were left there for nine days. They were then slaughtered and no lesions were found on *post-mortem* examination. In the second experiment an interval of seven days was allowed to elapse between the dressing of the field and the arrival of the animals. On this occasion five cows and five sheep were used. The animals were left there for seven days ; the sheep were then slaughtered and no lesions were found on *post-mortem* examination. The cows remained healthy.

During the experiment the animals relished the pasture and had eaten it bare in four days with the result that they had to be given additional feeding. Their behaviour during the experiment was normal. The milk from the cows was normal in every way and was fed to calves with no ill effects.

One animal was grazed in a field which had been treated with calcium-nitrogen that had been manufactured under the " oiled " process ; the results were the same as with the other experiments.

The author concludes that this fertilizer is harmless for grazing stock.

—G. Dods Munro.

Lafenetre, H., Monteil, L., & Galtier, F. (1935). L'ictère hémorragique du mouton résulte-t-il d'une intoxication cuprique. [**Connection between Haemorrhagic Jaundice of Sheep and Copper Poisoning**].—*Rev. vét. Toulouse.* **87.** 263-275. [12 refs.]

Haemorrhagic jaundice of sheep found in the Midi of France has been described as an anaplasmosis although efforts at transmission and treatment by trypan blue have failed. Cases occur principally from October to January when the vineyards have been heavily sprayed with copper sulphate. The symptoms displayed (dark-coloured urine, icterus, normal temperature) and the lesions found *post-mortem* (hypertrophy of the spleen, congestion of the liver and haemorrhagic nephritis) are comparable with those of experimental cases of copper poisoning. Unfortunately chemical examination of the organs for copper was not carried out except in one ewe which had been condemned at the abattoir and which had not shown symptoms of haemorrhagic jaundice when alive. Chemical examination revealed large amounts of copper in the heart, liver, kidneys and spleen.

Certain of the existing work on copper poisoning in animals is reviewed. —G. D. Shearer.

Höll, K. (1935). Die Entgiftung von bleihaltigem Wasser. [**Adsorption of Lead from Water by Charcoal**].—*Dtsch. tierärztl. Wschr.* **43.** 339.

Water can be freed from small amounts of lead by shaking with a little charcoal, which adsorbs the lead and holds it in colloidal suspension. The water is then freed from the charcoal and the adsorbed lead by filtration through a Berkefeld filter candle or through a layer of magnesite.—G. D. Shearer.

Rimington, C. (1935). **Isolation of the Toxic Principles of** *Cucumis Africanus* **L.f.,** *Cucumis myriocarpus* **Naud. emend. Schweikerdt and of** *Cucumis leptodermis* **Schweikerdt sp. nov. Their Characterisation as Trilactones belonging to the " Bitter Principle " Class.**—*Onderstepoort J. vet. Sci.* **4.** 65-90. 7 figs., 2 plates, 7 tables. [11 refs.]

The author found that *C. africanus* and *C. myriocarpus* contained only one toxic principle which was given the name " cucumin ", whereas *C. leptodermis* contained a second crystalline toxic principle which was given the name " leptodermin ". It was found that these substances, in common with some of the complex lactones used as fish poisons by natives, were toxic for fish. Their toxicity for rabbits and guinea pigs was determined. " Cucumin " appears to be devoid of any anthelmintic properties.—E. M. Robinson.

Emmel, M. W. (1935). **The Toxicity of Glottidium Vesicarium (Jacq.) Harper Seeds for the Fowl.**—*J. Amer. vet. med. Ass.* **87.** 13-21. 1 fig., 1 table.

The toxic dose of *G. vesicarium* seeds when fed forcibly to fowls was found to be 150 seeds. One hundred seeds caused symptoms of poisoning but not death. *Post-mortem* examination revealed a necrotic enteritis and a necrosis of the lining of the bulbous portion of the gizzard. The lesions were found to be identical in natural and in experimental cases of poisoning. A cytological study of the blood during the course of the intoxication was also carried out.—G. D. Shearer.

Graham, R., & Michael, Viola M. (1935). **White Snakeroot Poisoning.**—*Circ. Ill. agric. Exp. Sta.* No. 436. pp. 12. 5 text figs., 1 plate. [1 ref.]

White snakeroot (*Eupatorium urticaefolium*), which grows abundantly in the pastures of Illinois, is commonly poisonous to cattle, sheep and horses, and may cause poisoning in man through drinking milk or eating meat from affected animals. The poisonous principle is tremetol, for which a simple test is described.

Cattle seem to suffer from a chronic form of poisoning, and a diagnosis can sometimes be made by observing a trembling of the voluntary muscles on making the animal move, hence the name " trembles ". Sheep and pigs are similarly

affected. The disease follows a more acute course in horses, which may sometimes die two or three days after showing symptoms. The disease is most prevalent in late summer and early autumn. No satisfactory method of treatment of the disease has been evolved.—G. D. Shearer.

Hobson, G. (1935). **Clinical Notes on Rhododendron Poisoning.**—*Vet. Rec.* **15.** 919-920.

The author describes two cases of rhododendron poisoning in a Highland cow with calf at foot and in a " dry " cow. The temperature was normal and the faeces were blood-stained in both cases. Both animals became violent when the head was touched. Recovery was effected by administration, by stomach tube, of 1·5 lb. of Epsom salts and 2 lb. of treacle in two gallons of tepid water.—G. D. S.

Steyn, D. G., & Rimington, C. (1935). **The Occurrence of Cyanogenetic Glucosides in South African Species of Acacia. 1.**—*Onderstepoort J. vet. Sci.* **4.** 51-63. 6 figs. [5 refs.]

Cyanogenetic glucosides were found in five South African species of acacia, *A. giraffae*, *A. lasiopetala*, *A. robusta*, *A. litakunensis* and *A. stolonifera*. A cyanogenetic glucoside was isolated from *A. lasiopetala* which does not correspond to any known cyanogenetic glucoside. Methods are described by which the pods of these acacia species may be fed to stock with safety. Small amounts should be fed at a time. Moistening of ground-up pods with water is a dangerous procedure. The addition of sulphur to the ground-up pods will prevent prussic acid poisoning. —E. M. Robinson.

## PHYSIOLOGY.

Turner, C. W. (1935). **The Structure of the Cow's Udder.**—*Bull. Mo. agric. Exp. Sta.* No. 344. pp. 16. 19 figs.

Turner describes in some detail the architecture of the udder, its internal structure and histology, the mode of milk secretion, its blood supply and lymphatic and nervous systems. The value of his description is greatly increased by numerous diagrams and photographs.—A. W. Stableforth.

Srnetz, A. (1934). Beitrag zur Topographie der Bauchorgane des Schweines. [**Topography of the Abdominal Organs in Pigs**].—*Prag. tierärztl. Arch.* **14.** 81-92, 103-110 and 129-139. 16 figs. on 4 plates. [33 refs.]

This series of articles embodies a comprehensive survey of the anatomical organs in pigs aged from three to nine months. The survey was undertaken from the surgical-anatomical aspect, with special reference to the operations of ovariotomy and Caesarean section. The formalin-injection and frozen-section method was adopted.

When the flank is opened on the left side, the caecum has to be pressed ventrally in order to reach the ovarian ligament, whilst on the right flank the convolutions of the small intestine are found. On the dorsal aspect of this region, to the right or left of the median line, the descending colon is found. When the finger is inserted into the wound, the colon slips towards the pelvis and the broad ligament of the uterus can then be twisted round the finger. The ovary of the respective side can then easily be found. If the finger follows the descending colon to the other side of the abdominal cavity, the broad ligament on that side can similarly be found.—D. J. Anthony.

Wajgiel, E. (1935). O praktycznem znaczeniu ziarenek teczówkowych u koni. [**Corpora Nigra of the Iris in the Eyes of Horses**].—*Przegl. wet.* **48.** 65-72. 3 figs. [20 refs.] [Abst. from German summary].

The eyes of 920 horses were examined for the condition of the corpora nigra. In 56 horses they were absent from both eyes. In 18 horses they were present in only one eye and in the remainder they were present in both eyes.

The number, size and position of the individual corpora nigra varied a good deal. In most cases they were limited to the upper margin of the iris, but in many cases they were present at the lower margin too. Their form does not change during life, so this fact can be utilized for the identification of horses.

In one horse they were so big that they interfered with vision, but an operation removed this disability.—J. E.

Götze, R. (1935). Rosse und Unfruchtbarkeit der Stuten. [**Heat and Sterility in Mares. The Mating of Mares for Optimum Fertility**].—*Dtsch. tierärztl. Wschr.* **43.** 161-163.

Wagner, H. (1935). Wege zur Erzielung einer höheren Trächtigkeitsziffer bei der Stute. [**Ways to Increase the Fertility Index in Mares**].—*Ibid.* 257-260. [9 refs.]

The subject matter of these articles is of paramount importance in the horse-breeding industry and the present state of affairs, in which the number of successful foalings is only some 50 per cent. of the number of mares served, shows the extent of the losses sustained.

Götze, in a lecture to a horse-breeders' society, outlines the position and gives general advice, while Wagner, a veterinary official at the Württemberg stud at Marbach, also discusses the problem and gives the results of his breeding operations.

The following important facts have proved very valuable in increasing the fertility index. Fillies have their first ovulation when two years old, and only one during the year. As they grow older, they have two and then three ovulations per annum. Ovulation usually occurs at oestrum, but either may occur alone. The time for service is all-important. As is well-known the first oestrum occurs round about the ninth day after a normal parturition and is the most favourable oestral period to use for mating. An oestral period consists fundamentally of three three-day periods in direct succession, and the mare may be receptive during each of them. This has been confirmed by Wagner who instituted a routine procedure, in which the mare is served on the second, fifth and ninth day after the appearance of signs of oestrum, but only if clearly willing at the two latter dates. He assumes that, if conception follows service, the mare will not accept the stallion even at the next serving date three days later. On this hypothesis he gives the following data :- of 418 mares so treated, 153 (36·6 per cent.) conceived on the second day, 210 (50·24 per cent. of the total, but 79·24 per cent. of the remaining 265 mares) on the fifth day, and 55 (13·16 per cent. of the total, but all the remainder) on the ninth day. This is 100 per cent. success.

In addition to these physiological data, Götze outlined the practical steps to be taken to detect, prevent and eliminate disease conditions of importance for fertility. He also recommends the hormonal diagnosis of pregnancy to be carried out seven or eight weeks after the last service.—J. E.

Harington, C. R. (1935). **Biochemical Basis of Thyroid Function.**—*Lancet.* **228.** 1261-1267. [21 refs.]

This paper discusses the chemistry of the thyroid gland with particular

reference to the combinations in which iodine is found. Only about half of the iodine in the gland is present as thyroxine, but recent work has shown that the therapeutic activity of the gland is proportional to the amount of iodine it contains. Diiodo-tyrosin is also present, and it is suggested that the active secretion of the thyroid is a combination of this with thyroxine, bound together by some indirect link. The view is held that Graves' disease is a hyperactivity of the gland, and not a malfunctioning. Iodine therapy in Graves' disease is only of temporary benefit, and the intermittent administration of iodine is fraught with danger. It is suggested that this disease is probably caused by some factor extrinsic to the thyroid, possibly an excessive secretion of the thyrotropic hormone elaborated by the anterior pituitary.—Henry Dryerre.

Vaulont, H. (1935). Untersuchung des Katzen- und Pferdeblutes. [**Comparison of Feline and Equine Blood**].—*Inaug. Diss. Giessen.* pp. 12. 8 tables. [32 refs.] [Also published in *Z. Biol.* **96.** 241-252].

Data are given on the normal blood pictures of 20 cats and 20 horses of both sexes. The results were as follows.

Cats.—6·68 to 9·43 million red blood cells per c.mm. ; haemoglobin – 10 to 14·96 g. per 100 c.c. : white blood cells – 9·22 to 24·05 thousand per c.mm., of which the percentage of neutrophiles was 41·6 to 84·4, eosinophiles 0·8 to 18, monocytes 1·2 to 3·4, lymphocytes 8·4 to 45·2 and basophiles about 1.

Horses.—6·14 to 10·27 million R.B.C. per c.mm. ; haemoglobin – 10·08 to 17·28 g. per 100 c.c. : W.B.C. 6·42 to 12·39 thousand per c.mm., of which the percentage of neutrophiles was 44 to 65·6, eosinophiles 0·8 to 7, monocytes 1·8 to 5·2, lymphocytes 30·2 to 50 and basophiles about 1.—J. E.

Amadon, R. S. (1934). **Blood Analysis.**—*Vet. Ext. Quart. Univ. Pa.* **35.** No. 56. 1-8. 1 table.

Blood analysis is often of great use in aiding or confirming pathological conditions in man but, until satisfactory standards for each normal species of animal are evolved, the significance of values obtained in disease conditions cannot be realized.

In this communication the author gives figures, both cytological and chemical, for the normal horse, ox (calves and fat steers), sheep and dog. The average value and range for each constituent is given. Blood from about 30 animals of each species was used to obtain the average figures.—G. D. Shearer.

Muir, R., & Niven, Janet S. F. (1935). **The Local Formation of Blood Pigments.**—*J. Path. Bact.* **41.** 183-197. 8 figs. on 2 plates. [14 refs.]

Mice, rats and rabbits were injected with homologous blood and haemoglobin and the subsequent tissue reactions were studied to determine how, when and where destruction of erythrocytes and the subsequent formation of blood pigments occur. In the three types of animals used the reactions were similar apart from minor variations.

The essential reaction to the presence of blood in tissues is phagocytosis of the red blood corpuscles by histiocytes, followed by the formation of haemosiderin within these cells. Evidence that this occurred could be obtained 24 hours after the injection by the prussian blue reaction for free iron. These pigment-bearing cells were not fixed to the site of injection but wandered into adjacent areas. In about eight days after injection and the formation of haemosiderin, haematoidin crystals made their appearance in the cells which previously contained haemosiderin and, as the process of crystal formation advanced, so did haemosiderin

disappear. The extra-cellular formation of either haemosiderin or haematoidin [a statement frequently made in text-books regarding pigment formation following tissue haemorrhage] was not observed. Similar results were obtained by the injection of haemoglobin, but in neither type of experiment was there any evidence of haemoglobin diffusion into adjacent tissues. No contention is as yet made that these facts coincide with the formation of blood pigments in the human being following tissue haemorrhage.—J. R. M. Innes.

Cantarow, A., & Stewart, H. L. (1935). **Alteration in Serum Bilirubin and Bromsulphalein Retention in Relation to Morphological Changes in the Liver and Bile Passages in Cats with Total Biliary Stasis.**—*Amer. J. Path.* **11.** 561-581. 6 charts. [25 refs.]

Few research workers have attempted to correlate changes in hepatic function with the morphological changes in the liver at varying intervals during total bile stasis. This paper consists of determinations of the serum bilirubin concentration and degree of bromsulphalein retention in a series of 29 cats with uncomplicated total bile stasis produced by ligation of the common duct. Simultaneous morphological and functional data were obtained every 24 hours up to the 16th day following ligation of the common duct. There was a marked degree of individual variation in serum bilirubin concentration, and there was no demonstrable correlation between the morphological changes and the serum bilirubin concentration at any given time during the period of total bile stasis. The range of individual variation in the degree of bromsulphalein retention was more marked than in that of bilirubinaemia, and was not consistently related to the duration of the stasis or to the serum bilirubin concentration. There was no apparent correlation between the degree of dye retention and the morphological changes in the liver and bile ducts. The authors conclude by discussing the relation of anaemia, activity of haemoglobin regeneration and suppression of bile acid synthesis to their possible influence upon the changes in serum bilirubin concentration during total stasis.
—James Stewart.

Palmer, L. S., Fitch, C. P., Gullickson, T. W., & Boyd, W. L. (1935). **Supplementary Report of an Experiment to Determine the Effects of a Low Calcium Ration on Reproduction in Cattle. Effects of Further Reduction in Calcium and of Removing Vitamin Supplements.**—*Cornell Vet.* **25.** 229-246. 1 fig., 10 tables. [6 refs.]

It was previously reported by the authors that cows receiving only 0·18 per cent. of calcium in the dry matter of their rations, which were otherwise nutritionally complete, did not show any decrease in breeding efficiency and no marked effect, attributable to the level of calcium in the diet, was observed in the chemical composition of their blood and milk. This paper contains the results of further work, but with a lower plane of calcium in the ration. Three cows that had reproduced normally on a ration containing 0·18 per cent. of calcium did not abort when on a ration which contained only 0·12 per cent. of calcium but which was otherwise complete from a nutritional standpoint. This ration did not affect either the production or the composition of the milk of these cows, but a definite decline in the total and ultrafiltrable calcium of the blood plasma was discernible. Little change was observed in the bone analysis of these cows except for a very slight fall in total ash and calcium carbonate content. Five other cows which had had normal pregnancies during three years on rations containing 0·18, 0·35 and 0·65 per cent. calcium, and also cod liver oil and canned tomatoes as sources of vitamins, did not show any significant change in breeding efficiency when

these vitamin supplements were removed from the ration. Milk production was unaffected by the change and very little alteration was found either in the milk or blood composition, except for a very slight decline in the total and unfiltrable calcium of the blood. No significant changes occurred in the chemical composition of the bones of the cows after withdrawal of the vitamin supplements from their rations.—James Stewart.

Kellermann, J. H. (1935). **Sulphur Metabolism. I. The Absorption and Excretion of Flowers of Sulphur.**—*Onderstepoort J. vet. Sci.* **4.** 199-228. 11 tables. [89 refs.]

The author found that, when flowers of sulphur were administered to rats and sheep, absorption and excretion of the sulphur did take place, but at a slow rate. Absorption took place in the form of hydrogen sulphide, and excretion in the form of sulphates. The concentration of easily available " food sulphur " in the basal ration affects the level at which the administration of elementary sulphur will commence to show toxic effects. The absorption of elementary sulphur by sheep when added to a basal ration at the rate of 5 g. per day was found to be 28·13 per cent. No harmful effects were observed in sheep, but rations containing 1 per cent. sulphur produced toxic effects in rats.—E. M. Robinson.

## TECHNIQUE.

Rosenstein, Carolyn, Levin, Ida, & Levin, Hattie. (1935). **The Bactericidal and Antiseptic Action of Preservatives Frequently used in Biological Products, and the Effect of these Preservatives on the Potencies of the Products.**—*Amer. J. Hyg.* **21.** 260-279. 6 tables. [14 refs.]

The preservatives under examination included phenol tricresol, "merthiolate," and a mixture of the latter with phenol. Various percentages of the preservatives were used and each of the three contaminants, namely, diphtheroids, *Pseudomonas pyocyanea* and staphylococci, was added in definite amounts to mixtures of the biological products and preservatives. The biological products used were horse-serum, scarlet fever toxin, diphtheria antitoxic globulin, tetanus antitoxic globulin and meningococcus antiserum.

On diphtheroids the effect of the preservatives was modified by the nature of the product. Storage had little effect on the results, except that 0·5 per cent. phenol gradually lost its ability to destroy organisms after prolonged storage in an antitoxic globulin, toxin or antiserum.

In the case of *Ps. pyocyanea* the character of the product again modified the action of the preservative, while with staphylococci the results were uniform.

The experimental results led the authors to conclude that not one of the above preservatives alone controls the types of contamination found in biological products. A combination of 0·25 per cent. phenol and 1 : 20,000 " merthiolate " will destroy the contaminants in 48 hours. Its efficiency is not impaired after storage for ten months at 5°C.

The bactericidal action of preservatives is generally retarded by storage at low temperatures. After ten months' storage the potency of the preservatives mentioned was not affected.—F. H. Manley.

Hauptmann, W. (1935). Ein elektives Kulturverfahren zum Nachweis von Bang-Bakterien (Brucella abortus) in Patientenblut. [**A Selective Culture Medium for the Demonstration of** *Br. abortus* **in the Blood**].—*Zlb. Bakt. I. (Orig.).* **134.** 221-232. 1 fig., 4 tables. [21 refs.]

Hauptmann finds that Victoria blue 4 R (Grübler) is better than fuchsin or

gentian violet for the selective cultivation of *Br. abortus* from blood. He gives details of eight positive and four negative cases, and concludes that the blood sample should consist of at least 5 c.c. of citrated blood, and should be taken at the time of the day when the temperature is highest (at least 37·5°C.). The blood sample of 5 to 8 c.c. is sown into five times its volume of liver broth and the Victoria blue then added to give a concentration of 1 : 20,000. After three days' and five or six days' incubation in an atmosphere containing $CO_2$, subcultures are made on liver or glycerin agar. The citrated blood had in most cases been kept for 24 to 50 hours before use, in some cases in the cold, in some not.—A. W. S.

Siewers, E. G. (1934). Untersuchungen des Blutes von Mastrindern mit Hilfe des Guttadiaphotes und der Sublimatprobe. [**Investigations into the Blood of Cattle with the Guttadiaphot and the Sublimate Test**].- -*Inaug. Diss. Hanover.* pp. 54. 2 figs., 5 tables. [15 refs.]

The blood of 177 fat cattle was subjected to the guttadiaphot test and, in addition, to the sublimate test, and the results were later compared with the findings after slaughter. In neither case did the results of the tests have any significance corresponding with the diseased conditions found (chiefly mild tuberculosis and liver fluke infestation).

Well-nourished cattle evidently have a variable amount of euglobulin in their serum.—J. E.

## OFFICIAL AND OTHER REPORTS.

Australia, Queensland. (1934). **Report of Chief Inspector of Stock** [Cory, A. H.].—*Rep. Dep. Agric. Qd. 1933-1934.* pp. 148-152. 9 tables.

Experimental shipments of chilled meat to England have been satisfactory and the prices realized in London have averaged approximately £4 per carcass more than for frozen meat.

The buffalo fly [*Lyperosa exigua*] has not spread in the north-west portion of the state to any extent during the last few years. The Veterinary Medicines Act has been brought into force and many medicines examined. The quarantine regulations, dealing with the term of quarantine on certain imported animals, were varied in the course of the year and the details of these changes are given. Work on the tick-cleansing areas has progressed satisfactorily despite unfavourable weather conditions. A table shows the number of animals condemned at the abattoirs for various causes ; the large majority of condemnations in cattle were for tuberculosis.—W. I. B. Beveridge.

Australia, Queensland. (1934). **Report of the Director, Animal Health Station [Yeerongpilly].** [Rudd, J. A.]—*Rep. Dep. Agric. Qd. 1933-1934.* pp. 155-157.

Bovine mastitis appears to be on the increase, and vaccination has been fairly widely adopted. Other preventive measures, such as clipping the hair around the udder to aid cleanliness and using a low vacuum on milking machines before and after calving, are also considered to give a measure of protection. Tick fever has been prevalent owing to a heavy rainfall. Preventive vaccination against bovine pleuro-pneumonia has been carried out on a large scale ; the seton method is usually employed but hypodermic injection is considered preferable, the inoculum in each case consisting of pleural exudate. Several outbreaks of blackleg have occurred in young cattle and contagious abortion seems to be increasing.

The Veterinary Officer reports that the outstanding troubles appear to be poultry diseases, sterility of dairy cattle and diseases of pigs.

The Parasitologist reports that the work of RANSOM and CRAM on the life-history of *Ascaris lumbricoides* has been confirmed. It was observed that an immunity to the larvae may be acquired by pigs. Oil of chenopodium and castor oil removed 89 to 100 per cent. of worms from eight pigs. An outbreak of trichostrongylosis in lambs is recorded, which is unusual in Queensland. Experiments showed that the cattle tick, *Boophilus microplus*, is able to reach maturity on horses, sheep and dogs.—W. I. B. BEVERIDGE.

TUNIS. (1934). Le service vétérinaire pendant l'année 1933. [**Report of the Veterinary Service, Tunis, for 1933**]. [COTTIER, H.]—*Bull. Off. internat. Epiz.* **9**. 31-37.

CONTAGIOUS DISEASES.—Anthrax and blackleg were not prevalent, only about 50 cases of each being diagnosed. Twenty-one cases of tuberculosis of dairy cows were found at abattoir inspection. All imported cattle have to pass a tuberculin test. No case of swine erysipelas or glanders was observed. There were outbreaks of foot and mouth disease, but there were no cases of rinderpest or contagious bovine pleuro-pneumonia. Dourine was reported in 1932, but not in 1933. Rabies was diagnosed in 53 dogs, 3 horses, 1 donkey, 2 bovines and 2 cats. Sheep pox and sheep scab were enzootic; these are being attacked by state control measures. Bovine contagious abortion is increasing.

An outbreak of "typhoid fever" of horses caused great losses, which were arrested by vaccination, using bacteria cultured from bone-marrow of early cases. Good results are reported from the use of "novarsenobenzol". Johne's disease was present in three districts.

Piroplasmoses are economically the most important animal diseases, as is the case in Algeria. Equine nuttalliosis and bovine theileriasis (*Th. dispar* infection) cause the greatest losses.

DIAGNOSTIC WORK is carried out at the Arloing Institute [see this *Bull.* **5**. 55].—J. E.

GERMANY. (1934). Veröffentlichungen aus den Jahres-Veterinär-Berichten der beamteten Tierärzte Preussens für die Jahre 1931 und 1932. [**Annual Veterinary Reports of the Prussian State Veterinarians for 1931 and 1932**]. [MÜSSEMEIER, & HOFFERBER].—Pt. 2. pp. 335. 25 tables, 1 map. Berlin: Richard Schoetz. [4to].

This is a most comprehensive report, covering animal diseases, all aspects of public health in which veterinarians take part, and the livestock census.

INFECTIOUS ANIMAL DISEASES.

The sections consist of a short account of the diseases as encountered during the period, copies of individual reports from officials and a description of control measures adopted. Some diseases are described in great detail. [Some diseases, common to all countries, and having nothing of interest to report on, have been passed over in this abstract].

DISEASES OF HORSES.

*Brucella abortus* INFECTION.—The disease was observed in East Prussia, and cases in which the organism was associated with fistulous withers and poll evil are described. Three infected mares produced live foals.

NAVEL ILL.—This disease caused small losses: four types of different aetiology are described. Vaccination was used with success in many districts.

EQUINE INFECTIOUS ANAEMIA.—This was wide-spread, but the incidence was somewhat reduced in comparison with 1930. The disease appears to spread by the medium of latent infection. Particular attention was given to haematological

diagnosis, and a special contribution on this point by Hofferber is included. Curative treatment is hardly ever of value.

Borna Disease.—Six outbreaks came under observation. Compensation is paid for losses. The first reports on the use of vaccination were favourable, but a few more years' observation is necessary before an opinion can be formed of its value.

Periodic Ophthalmia.—This was observed in most districts. Some reporters suggested that marshy ground was associated with the disease. Success in treatment was claimed with a course of " chinosol ", administered intravenously (3 g. in 200 c.c. of distilled water), combined with mydriatic treatment.

" Wasenmeisterkrankheit ".—This is a disease of horses which has been observed in the district of Angermünde (Potsdam). The chief characteristic is pharyngeal paralysis, which develops slowly, so that apparently healthy horses lose condition owing to the progressive inability to swallow. Paralysis may be complete in a matter of days [no figures given], and death occurs after an illness of ten to 21 days.

One horse, examined after death, showed a " nutmeg " liver, a congested pharynx full of masticated hay, and hyperaemia with focal haemorrhages of the brain. Botulism was suspected, but not confirmed, and the cause was not elucidated. [This disease clinically resembles " grass sickness "].

## Diseases of Cattle.

Mastitis.—The disease showed a fall in incidence. Numerous reports are given, and great variations in the results of treatment were recorded.

Johne's Disease.—Many individual reports are given. A policy of isolation and slaughter is advised . [No mention is made of allergic diagnosis].

Paratyphoid Infection of Cattle and Calves.—This section consists of individual reports of *Salmonella enteritidis* infection. It causes a more or less rapid emaciation, and slaughter animals so infected are a danger to human beings.

White Scours of Calves.—This was common. All reporters emphasized the importance of hygiene as a control measure, and opinions on specific treatment varied.

Infectious Pneumonia of Calves.—This affects calves of all ages : some recovered under treatment with serum. The nature of the infection is not described.

Contagious Abortion.—The disease was wide-spread. The necessity for a comprehensive control scheme was urged by many officials, who were mostly against the use of a live vaccine. Various control schemes, including one for voluntary application in the province of Hanover, were advanced : the full text of the latter is given. Several case records of human brucella infection are given.

Piroplasmosis.—This was observed as causing redwater in some districts and was said to be curable by chemotherapy.

Malignant Catarrh.—This was present in many parts, and Götze's sheep theory was confirmed in most cases. A few recoveries were reported.

Granular Vaginitis.—Opinions were divided as to whether this causes sterility. The condition is also reported in swine and goats.

Sterility.—This was found to have increased in some areas. A few reporters stress the importance of a knowledge of local conditions in undertaking treatment.

Infectious Ophthalmia.—A few outbreaks were reported. Recovery under symptomatic treatment was usual.

## Diseases of Sheep.

Bradsot.—This was observed in the north-west. Two outbreaks are described ; only pregnant ewes were affected. The causal organism was given as " *B. gigas* ".

Borna Disease.—This was observed in one district. In a flock of 350 sheep, 40 became affected and 38 died.

### Diseases of Swine.

Paratyphoid Infection.—Two outbreaks, one acute and the other chronic, are described. In the former, the pigs showed fever, reddened skin and diarrhoea and, on autopsy, a purple swollen spleen, swollen liver, petechiae in the kidney cortex, congested intestinal lymph glands, yellowish-grey masses in the mucosa of the caecum and colon (no deep-seated changes) and petechiae under the serous membranes. Bacteria of the *suipestifer* group [*Salmonella cholerae-suis*] were found in the organs and flesh. The presence of swine fever was excluded.

The outbreak of chronic paratyphoid had lasted for 18 months when investigated. Animals showed diarrhoea and general ill-health. The intestines showed changes similar to those seen in the acute form ; necrotic foci and abscesses were also present in the lungs. In both herds, milk had been used in the rations.

Diseases of Piglets.—One official diagnosed 110 out of 172 miscellaneous deaths in piglets as being due to bad management, only 51 cases being diagnosed as due to infection. " Rust " or " soot " (serous eczema, passing into a condition of black skin deposit) gave trouble in some places. The condition begins as an eczema around the eyes, and quickly spreads over the body. Clean quarters are the best preventive.

A serious disease of sows and their piglets was investigated, but without result. The sows showed a yellow coloured skin, skin crusts and pruritus, and the litters, which were born healthy, became similarly affected after two or three weeks. Loss of condition, but not of appetite, followed, and 1,000 animals were finally lost.

An enzootic hepatitis of piglets is also described ; it is attributed to excessive protein in the ration. Non-specific protein therapy gave very good results.

### Diseases of Fowls.

Individual reports are given on avian tuberculosis, fowl pox, *Salmonella pullorum* infection and fowl paralysis.

### Diseases of Other Animals.

Notes are given on surra in camels, Stuttgart disease of dogs, dog distemper, diseases of fur animals, deer, hares, rabbits, parrots and fish.

### Parasitic Diseases.

A short note on ringworm is given. Losses of cattle from injuries inflicted by sandflies (*Simulium* spp.) are recorded.

Reports are given of the use of " Delicia II " and " Larfugsalbe " against ox warbles.

Mange in cattle was reported from a few districts. The common helminth parasites caused their usual losses in livestock.

### Poisoning of Livestock.

[See separate abstract – this *Bull.* **5.** 854].

### Nutritional and Miscellaneous Diseases.

" Enzootic Haemoglobinuria " of Horses.—A detailed report was sent from one district. Affected horses showed haemoglobinuria for four to five days, then swelling of the cheek muscles and lingual paralysis developed with the consequent emaciation, and death occurred after eight to 12 days' illness. [The use of the term " haemoglobinuria " was apparently not based on chemical demonstration]. There was no paraplegia, as in myoglobinuria paralytica.

Investigation showed that the condition was an intoxication, causing necrosis of muscular tissue including the heart. The disease was observed to occur only

during warm spells in the winter. The food material was examined without any particular constituent being incriminated.

Cases of myoglobinuria paralytica [haemoglobinuria, azoturia] were also reported.

Leucaemia of Cattle (Lymphadenosis, Lymphosarcomatosis, Lymphocytomatosis).—This disease occurred both sporadically and epizootically in certain areas. Several individual reports are given.

Cases are found fairly frequently during meat inspection, and during work arising out of the voluntary tuberculosis eradication scheme. For diagnostic purposes, palpation of all the superficial lymph glands, examination of the blood picture and the red blood cell sedimentation test are useful. The cause is unknown. At autopsy, advanced cases show enormous swelling of the lymph glands and spleen, as well as changes [not detailed] in the organs.

Acute cases must be differentiated from anthrax, and chronic cases from tuberculosis. There is no successful treatment. [See also this *Bull.* **4.** 767].

Rhinitis [" Schnüffelkrankheit "] of Swine.—This was wide-spread, and particularly common in East Prussia. Affected piglets have shortened and deformed faces, and snuffle audibly. Most reporters spoke of the disease as an inherited pathological factor, and took steps to eliminate boars concerned.

Haff Disease.—Many cats died ; there was one case of a pig, fed on fish from the Frisches Haff [a large inland sea, connected with the Baltic Sea in east Prussia] becoming affected and showing haemoglobinuria. Cats commonly show paralytic haemoglobinuria, and die after a week's illness. A few young mink, fed for a time on fish from the Haff, also died.

The disease is believed to be due to a combination of factors affecting the water of the Frisches Haff. These factors are :– (1) the diverting of a fresh water supply from reaching the Haff ; (2) an increased opening between the Haff and the Baltic Sea, letting in more salt water than formerly, and (3) the deposit in the Haff of drain water from towns and from a cellulose factory.

The consumption of fish from the Haff causes disease in man and animals.

The remainder of the report describes the work connected with instruction in horse-shoeing, with knackeries, dairies, stock markets, animal breeding, quackery, abattoirs and meat inspection, including statistics, milk control, statistics on the veterinary personnel of Prussia and the census of livestock. Figures for livestock in the entire state of Prussia are given :– 2,300,000 horses, 10,000 mules and donkeys, 10,800,000 cattle (4,700,000 dairy cows, 145,000 bulls), 15,500,000 pigs, 3,367,000 sheep, 1,500,000 goats and 58,500,000 fowls.

The report is terminated by a list of acts and orders, relevant to the veterinary service, passed into effect in 1931 and 1932.—J. E.

Holland. (1934). Verslag over de Werkzaamheden van het Staatsveeartsenijkundig Onderzoekingsinstituut over het Jaar 1933-1934. [**Report of the State Veterinary Research Institute (for Foot and Mouth Disease) for the Year 1933-1934**]. [Frenkel, H. S.] pp. viii + 119. 18 tables, 4 graphs. [51 refs.] The Hague : Algemeene Landsdrukkerij. [8vo] [Fl.1].

In 1929 the Dutch government decided to found a foot and mouth disease research institute, and an island in Amsterdam harbour was chosen as its site, but lack of funds held up the project and the institute was meanwhile housed in the Rijksseruminrichting at Rotterdam, where work began in 1933. This is the first report, and the ten scientific articles about work done occupy the bulk of the publication [these are being abstracted separately].

The cases of foot and mouth disease observed in Holland during the year are mentioned : it was found that two types of virus, A and O, were present.—J. E.

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ERRATA.

Page 460, line 7, *for* 734 *read* 737.

„ 819, „ 40, *after* " susceptibility ", *insert* " to weather stain and body strike and susceptibility."

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